STRATEGY RESEARCH PROJECT

MEDICAL SUPPORT TO THE KENYA EMBASSY BOMBING, A MODEL FOR SUCCESS OR A PLATFORM FOR REFORM?

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Medical Support to the Kenya Embassy Bombing, A Model for Success or a Platform for Reform?

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ABSTRACT

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On 7 August 1998 at 1035 local time, a truck bomb detonated outside the US Embassy in Nairobi, Kenya. In concert with a similarly timed bomb in Dar Es Salaam, Tanzania, 220 persons, including twelve Americans, lost their lives. The Federal Government launched a massive effort to provide medical care to injured US citizens and return them to US facilities in Europe and America. This response effort, although heroic on the ground by immediate responders, was fraught with delays and confusion. Fortunately, the quality of the care in Nairobi saved lives and minimized morbidity. This paper looks at disaster medical support from historical and organizational perspectives, and reviews in detail the medical response effort to the Nairobi bombing.

Following the bombing, an Accountability Review Board systematically outlined major deficiencies in the overall response effort. The medical problems identified in this review, and others, serve as a focus of the recommended changes and preparations needed for the next terrorist bombing. Failure to critically look at the issues and interagency cooperation in the response effort will lead to repetition of the problems found in Nairobi and ultimately, the unnecessary loss of American lives.

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> A well prepared, ready and able military medical system conveys four powerful messages. It tells American people that its leaders have prepared means to care for their sons and daughters who may be sent into harm's way; it tells our adversaries that we have a credible, sustainable fighting force; it tells our military commanders that we will sustain their forces; it tells our troops that we care.
>
> — James A. Zimble

On 7 August 1998 at approximately 1035 local time, a truck bomb detonated at the basement garage ramp in the rear parking area of the US Embassy in Nairobi, Kenya. At virtually the same time, another vehicle bomb exploded outside the US Embassy in Dar Es Salaam, Tanzania. In these two separate, but linked events, 220 people were killed, including twelve American US Government employees and their family members, thirty-two Kenyan national US Government employees, and eight Tanzanian national US Government employees. Also killed in the Nairobi explosion were approximately 200 Kenyan nationals. In addition, 4000 Americans, Kenyans, and Tanzanians were injured. The blasts also severely damaged or destroyed the chanceries and other buildings in both Nairobi and Dar Es Salaam.[1]

After stabilization and treatment at local medical facilities, twenty-four seriously injured Americans and Kenyans were evacuated to the US Army's Landstuhl Regional Medical Center (LRMC) in Germany and eight Kenyans went directly to German hospitals. Additionally, one American went to Britain for treatment of a serious eye injury, and three non-critically-injured Americans were evacuated to Pretoria, South Africa. Eventually, twelve Americans and four Kenyans were moved to Walter Reed Army Medical Center in Washington, D.C. for further treatment.[2]

An Accountability Review Board, chaired by the former Chairman of the Joint Chiefs of Staff, Admiral (Retired) William J. Crowe, reviewed the response efforts to the blasts, and found a multitude of faults in both planning and response execution, many of them medically-related. The fragmented medical response to this sudden-impact disaster delayed care and will recur, in large part, due to agency and service compartmentalization. Is the Kenya Embassy Bombing a nodal point in changing our medical support response or a predictor of recurrent medical support challenges?

DEFINITIONS AND BACKGROUND

DEFINITION OF DISASTERS

The term "disaster" derives from the Latin terms *dis* for "against" and *astrium* for "stars." "Disaster" can therefore be literally interpreted as a calamity against mankind due to the misalignment of evil stars.[3,4] Normal, fundamental community services of a society become disrupted and associated widespread human and environmental losses typically exceed the community's emergency management capacity.[5] They normally imply involvement of a large geographic area with many casualties. However, "disaster" should be distinguished from "mass casualty incident" (MCI), defined as "...events resulting in a number of victims large enough to disrupt the normal course of emergency and health care services of the affected community. Use of the term MCI implies a limited geographic and demographic scope."[6] From the perspective of health care providers, disasters and MCIs are intimately related. For them, "disasters" perhaps can be better defined as "... the result of a vast ecological breakdown in the relation between humans and their environment, a serious and sudden event (or slow, as in a drought) on such a scale that the stricken community needs extraordinary efforts to cope with it, often with outside or international aid."[7]

DISASTER CLASSIFICATION

"Disasters" in the medical literature have been typically described as arising from internal (that is from within a health-care facility) or external causes (see Table 1). This paper focuses on disasters outside of a clinical setting, though those disasters shown below as "internal" clearly can be applied to events other than those that damage medical treatment facilities. Disasters can be classified by their characteristics as well, as seen in Table 2. Together, these two broad classifications of disasters are helpful as tools in formulating organizational disaster plans.

Lastly, as opposed to etiologies, disasters can also be categorized in terms of the response they evoke to the event. One such classification system is:

Level 1: the disaster is managed within a region and local emergency medical services (pre-hospital and within health care facilities) are adequate,

Level 2: local medical response capabilities are exceeded and the additional aid from other jurisdictions is required, and

Level 3: local and regional resources are overwhelmed and state or federal aid is required.[8]

DEFINITION OF DISASTER MEDICINE

Disasters often result in an MCI. The types of casualties in an MCI can normally be categorized into psychological, surgical (e.g. mechanical trauma from blast injury, penetrating trauma from shrapnel or flying debris, or burns), or medical (e.g. toxic inhalation or infectious diseases). Treating them is no simple exercise and managing the many other medical aspects of disasters can be problematic, requiring special expertise. The field of "disaster medicine" has recently burgeoned as a medical discipline that focuses on

the unique aspects of managing the consequences of disasters or MCI's. It has been formally defined as "the study and collaborative application of various health disciplines, e.g. pediatrics, epidemiology, communicable disease, nutrition, emergency surgery, social medicine, community care, international health, ... emergency medicine, psychiatry, toxicology, environmental sanitation, and veterinary medicine... to the prevention, immediate response, and rehabilitation of health problems arising from disaster."[9]

EXTERNAL		**INTERNAL**
NATURAL		Power failure
	Earthquake	Flood
	Tornado	Water loss
	Hurricane	Chemical or radiation accident/fumes
	Flood	Fire/explosion
	Storm	Loss of medical gases
	Fire	Violence/bomb threat or explosion
MANMADE		Inability of staff to reach hospital
	Terrorism	Elevator emergencies
TRANSPORTATION		
	Chemical/radiation accident	
	Mass gathering-hysteria/unrest	

TABLE 1. CAUSES OF DISASTERS [10]

ORIGIN		
	Natural	
		Geophysical
		Weather-related
	Man-made	
LOCATION		
	Single site	
		Single occurrence
		Multiple occurrences
	Multiple sites	
		Single occurrence
		Multiple occurrences
PREDICTABILITY		
	Fairly predictable	
	Unpredictable	
ONSET		
	Gradual	
	Sudden	
DURATION		
	Brief	
	Extended	
FREQUENCY		
	Common	
	Rare	
DETERMINANTS OF MAGNITUDE		
	Size of involved area	
	Extent of damage to people/property damage	
	Extent to which community resources are overwhelmed	

TABLE 2. CHARACTERISTICS OF DISASTERS[11]

HISTORY OF DISASTER RESPONSE IN THE UNITED STATES

Recent disaster response in the Unites States dates to the 1964 earthquake in Alaska where needs far-exceeded local resources and many questions arose regarding the Federal Government's ability to respond to such an event. Governmental review led to development of the Disaster Relief Act in 1974 which outlined the law and procedures for state governors to formally request federal assistance. As a follow-on, the Federal Emergency Management Agency (FEMA) was created in 1979 primarily in response to the needs of the Cold War; by 1989, however, it became empowered and funded to focus its efforts on other disaster responses as well. The current basis for a federal disaster response in the United States is PL 93-288 (and later amended in PL 100-707) , the Robert T. Stafford Disaster Relief and Emergency Assistance Act (most commonly known as the "Stafford Act"). This law gives the federal government "an operational document and budget with which disaster responses [can] be mounted."[12]

Under the guidance of FEMA, the response to a federally-declared disaster within the United States, known as the Federal Response Plan (FRP), is divided into twelve functional areas called "Emergency Support Functions" (ESFs; see Table 3). Hurricane Andrew in 1992 saw the first use of the FRP. In such a disaster, FEMA provides overall direction to the lead and support agencies within each ESF. Additionally, the FRP "calls for an entire administrative structure to be established at the Washington, regional, state, and disaster site levels."[13] However, fundamental to the federal disaster response is that the federal assets deploy to assist and coordinate with the state government, which maintains overall responsibility for any disaster within its boundaries. [14]

FUNCTION	LEAD AGENCY
1. Transportation	Department of Transportation
2. Communication	National Communication System
3. Public Works/Engineering	Dept. of Defense (US Army Corps of Engineers)
4. Fire fighting	Department of Agriculture
5. Information/Planning	FEMA
6. Mass Care	American Red Cross
7. Rescue Support	General Services Administration
8. Health and Medical Services	Dept. of Health and Human Services
9. Urban Search and Rescue	FEMA
10. Hazardous Material	Environmental Protection Agency
11. Food	Department of Agriculture
12. Energy	Department of Energy

TABLE 3. THE TWELVE EMERGENCY SUPPORT FUNCTIONS[15]

Beginning in 1980 as the Civilian-Military Contingency Hospital System (CMCHS), the national response for mass medical needs was designed to increase the number of beds available to the military health care system in times of emergency. Following a 1981 review of the federal disaster response to the eruption of Mt. St. Helens, the National Disaster Medical System (NDMS), under the lead of the Office of Emergency Preparedness (OEP) in the Department of Health and Human Services (DHHS), replaced and updated the CMCHS. NDMS also includes the Department of Defense (DOD), the Department of Veterans Affairs (DVA), and FEMA. OEP, in addition to providing overall direction to NDMS, also oversees the development, training, and implementation of Disaster Medical Assistance Teams (DMATs) and other specialty teams. DOD assists in transportation and medical support, DVA provides physical facilities and medical supplies at the disaster site, and FEMA aids with personnel, training, and funding.[16]

Under ESF 8, DHHS/OEP has responsibility for:

1. Assessment of health and medical needs,
2. Surveillance of health care issues,
3. Acquisition and distribution of medical personnel,
4. Acquisition and distribution of health and medical equipment and supplies,
5. Medical evacuation,
6. Inpatient care,
7. Food/drug/medical-device safety,
8. Worker health and safety,
9. Radiological monitoring,
10. Chemical or HAZMAT monitoring,
11. Biological monitoring,
12. Mental health assessment,
13. Development and dissemination of public health information,
14. Vector control,
15. Water and sewage management, and
16. Victim identification and mortuary services.[17]

The sixty-one DMATs and specialty teams that OEP supervise come from across the US, each normally sponsored by a local civilian agency, such as a regional trauma center. Approximately thirty-five volunteer medical personnel plus support personnel deploy with each team. When designated "on call" through a rotating schedule, team members must be prepared to deploy within twelve to twenty-four hours of notification, be self-sustaining for seventy-two hours, treat 250 patients, and remain on location for ten to fourteen days. In addition to providing both general surgical and medical capabilities, several specialty teams (e.g. burns, pediatrics, etc.) can also be generated and deployed. During the mission, team members become federal employees, though are tasked primarily to interface and support local medical systems.[18]

For comparison, FEMA oversees the implementation of twenty-five Urban Search and Rescue Teams under ESF 9, two of which are available for overseas missions. Analogous to the DMATs, private or local government agencies sponsor these teams. Approximately sixty-two personnel comprise each team, including six medical providers (two physicians and four team specialists). These medical personnel undergo specialized training and work alongside rescue personnel, providing treatment on site for approximately fifty patients, including ten critically injured and fifteen moderately injured. They operate under similar constraints when "on call", deploying within six hours and, being self-sufficient for ten to fourteen days.[19]

DOD has always played a role in disasters, both within the United States and overseas. Military forces are often in the vicinity of a disaster and can therefore easily respond. The American public normally invites their participation in disaster support because of the absence of a distinct military "class" within the framework of American society. Additionally, military forces, with their discipline, training, and equipment, are often the only assets capable of responding in a timely fashion. Depending on the disaster and the force availability because of other ongoing operations, they can provide: security, transportation and logistic support, command/control/communications/intelligence information, medical treatment and preventive medicine teams, specialized units (such as civil affairs), engineering support, and resources capable of handling chemical/biological disasters.[20] Additionally, the military spends much of its time planning and training for deployments to dangerous settings so movement to a disaster area is normally very feasible. The military has also recently played a very active role in disaster planning for a nuclear war; many of these plans and procedures easily translate to other forms of natural or man-made disasters.[21]

However, disaster support is not the primary purpose for the military and its role in disasters has been fraught with problems. First, the DOD has its own daily crises with personnel and equipment shortages for operational use, and DOD is structured to fight a war, not support a hurricane. Although DOD organizations commonly prepare for wartime missions, they do not (or have not historically) prepared for disaster-response missions, and planners typically do not receive special training in such mission requirements. Guidance and procedures for disaster support outlined in operations orders, contingency plans, doctrinal publications, and training manuals have only recently been developed.[22] Hence the response is often too little, or too much (such as sending too many, useless or poorly sorted medical supplies). Military forces may be ideal in some disasters where a threat (particularly man-made) persists, though may not be welcome or permitted to respond because of jurisdictional constraints or issues of neutrality. Finally, control and decision-making issues often arise when integrating the military command hierarchy with civilian leadership. [23]

THE THREAT OF DISASTERS FROM TERRORISM

Man-made disasters, the focus of this paper, tend to occur rapidly, with little warning. Unfortunately in recent history, many of these calamities result from the deliberate acts of individuals or

groups. Inherent in these acts is the definition of terrorism, described here as "...an act or threat of violence against noncombatants with the objective of exacting revenge, intimidating, or otherwise influencing an audience."[24] Terrorists have a variety of objectives, but ultimately they all use fright as their primary instrument. In using dread as their mechanism, they do not necessarily have to kill or threaten large numbers of people; often they accomplish their goals merely through the fear they instill.[25]

Defining terrorism is more than an academic exercise. Different government agencies interpret and respond to it in terms that relate to their sphere of interest and influence. Data they collect, for example, overseas terrorism by the DOS and domestic terrorism by the FBI, all aids in understanding trends and predictions. Unfortunately, no single organization collects and analyzes data on worldwide terrorist events. [26]

Regardless of the difficulties in collecting and sharing information, most agencies agree that terrorism against the US, particularly overseas, is a prevalent phenomenon. Why is this? Likely "...the scope of the US' international activities, from military operations to commercial business dealings, is seen by most analysts as the principal reason why the United States is a magnet for terrorist activity."[27]

The impact of terrorism clearly affects multiple governmental agencies. Presidential Decision Directive (PDD) 62 signed in May 1998, refined previously published departmental and agency responsibilities in PDD 39 (June 1995) in responding to terrorist events. Specifically it created the National Coordinator for Security, Infrastructure Protection, and Counterterrorism within the National Security Council (NSC). Both PDD 39 and PDD 62 clearly affirmed that the DOS is the lead agency for international incidents.[28] Analogous to FEMA, then, DOS is the lead agency for overseeing and coordinating the disaster response to overseas terrorist incidents.

With such delineation of responsibility, the response to a terrorist-initiated disaster affecting US interests overseas should be a well-tooled response. In reality, however, "...the NSC's National Coordinator [for Security, Counter-Terrorism, and Infrastructure Protection] oversees a complex, labyrinthine organization – one that is, in many areas, only loosely strung together by the dedicated efforts of mid-level managers of many stripes."[29] Many of the interagency policies, including command and control issues, remain uncompleted, according to the unclassified report titled "Combating Terrorism" by the General Accounting Office in May 1999. [30] Therefore, the federal response to a terrorist event that affects an embassy overseas remains fragmented and poorly coordinated in a fashion similar to the federal response to US-based disasters prior to the creation of FEMA.

NATURE OF BOMBING DISASTERS

EPIDEMIOLOGIC STUDY

Bombings are a unique form of sudden-impact disaster that evoke two primary responses, objective and emotional. In preparing for such a disaster, any intelligence available prior to the event intuitively aids both the planning and response effort. Epidemiologic study of bombing disasters can provide such information prior to, and during an event; it can also benefit the response effort and ultimately saves lives. "The overall objective of such epidemiological investigations is to assess the needs of disaster-affected populations, match available resources to needs, prevent future adverse health effects, evaluate program effectiveness, and permit better contingency planning."[31] Epidemiological aid to disaster-relief efforts is most beneficial if done proactively early in a response effort. The many roles epidemiology has in evaluating bombings include:

1. Pre-disaster vulnerability assessments and training recommendations,
2. Rapid medical needs assessment using valid epidemiological tools,
3. Monitoring and surveillance of the affected population,
4. Implementation of post-disaster disease-control strategies,
5. Assessment of resource utilization,
6. Morbidity and mortality studies,
7. Post-disaster follow-up studies of victims,
8. Information gathering for policy decisions, and
9. Tools for problem solving during the disaster.[32]

PREDICTABLE EFFECTS/HISTORICAL BOMBING DATA

Fortunately, many studies of bombings have been completed and reported in the medical literature. This data becomes invaluable in conducting risk analysis during disaster planning, and can aid in predicting early disaster-response needs, often when little information about the event is available. What follows is a cursory review of several recent studies that have looked at the phenomenon of terrorist bombings, principally in buildings. Review of this information lays the background for looking at disaster planning, and for predicting future response requirements. The studies reviewed here look only at the phenomena surrounding conventional munitions, not nuclear, chemical, or biological weapons.

Blasts from conventional explosives like TNT, produce an audible sound and an expanding sphere of hot gases. The blast wave has three phases: a positive phase, a negative phase, and blast wind. In the positive phase, the wave propagates outward radially at 3000-8000 m/sec, creating an overpressure greater than 6.9×10^{10} N/m^2 (approximately 10×10^6 PSI; as little as 0.25 PSI overpressure can produce short-duration wind velocities of 200 km/hr). The negative or vacuum phase, which lasts ten times longer

than the positive phase, sucks debris (such as glass) into new areas due to pressure dropping below ambient pressure. Finally, the expanding gases from the explosion create the blast winds.[33]

Injuries from conventional blast weapons can be classified as primary, secondary, and tertiary. Primary blast injuries are those affecting air-filled organs or viscera, such as the ears, lungs, and gastrointestinal tract. Secondary blast injuries directly result from the impact of moving debris, such as impalement from bomb fragments or flying glass. Tertiary blast injuries result from the blast causing displacement of the whole body. Finally, a variety of miscellaneous injuries can also occur, such as burns, inhalational injuries, and crush injuries.[34]

Time becomes compressed in such disasters, yet the management of casualties at the scene typically occurs in four distinct phases. The first is the chaotic phase, lasting approximately fifteen to twenty five minutes in an urban setting. Once the dust settles, the reorganization phase begins, normally lasting approximately sixty minutes. Next comes the site-clearing phase which lasts 100 to 180 minutes. Finally, the late phase of twenty four to forty eight hours after the event typically signals the end of rescue operations.[35]

Historically, many bombing incidents have occurred in the Northern Ireland conflict. In 1978, Hadden, Rutherford, and Merrett[36] conducted a retrospective review of medical records of 1532 bombing victims that were treated in the Royal Victoria Hospital, Belfast, Northern Ireland from August 1969 through June 1972. Their study looked at data from seventy-eight explosions, thirteen of which had more than twenty victims seen in the hospital. Although biased by the use of a single hospital's records, this report does provide valuable insight into the epidemiology of blast injuries. Of note, important information such as the time of the blasts, time from blast to patient admission, and the transport method were not reported.

In this study, most victims (83%) were seen between 1000 and 1900 hours. Of the 1532 patients seen, only 250 (16%) were admitted to the inpatient service; the rest were treated as outpatients and released. Only nine (0.6%) of those who reached the hospital died. [37]Surgical treatment of bomb-blast victims is usually the focus of disaster responses, though in this study, 76% of victims required none, and 18% required only simple wound cleaning and suturing. Five of the nine deaths were the result of chest and abdominal injuries (ten patients). Major limb amputations occurred in sixteen patients and resulted in the remaining four deaths. Fifty patients suffered burn injuries, but none required skin grafting.[38] Finally, 50% of the patients suffered some form of "emotional shock", most of whom had no physical injuries.[39] The authors' conclusions from this point source reference hospital were:

1. "The majority of patients sustain minor injuries and may be treated as outpatients, "
2. "Injuries predominantly affect the head and neck and peripheries, suggesting that clothing has a protective role,"
3. "Although injuries to the chest and abdominal organs are uncommon after explosions, they are all associated with a very high mortality," and

4. "Primary blast injuries of the lungs and abdominal organs are infrequently seen in survivors. It is possible they may be responsible for some deaths occurring before reaching [the] hospital."[40]

In 1983, Cooper, et al. reviewed casualties from four terrorist-bomb incidents: 17 July 1974 at the Tower of London, London, U.K.; 21 November 1974 at the Tavern in the Town Public House and in the Mulberry Bush Public House, Birmingham, U.K.; 5 October 1974 at the Horse and Groom Public House and the Seven Stalls Public House, Guildford, U.K.; and 6 February 1973 at the Old Bailey, London, U.K. (car bomb).[41] In these four incidents, there were 385 casualties of whom twenty-eight (7%) died and 104 (27%) were admitted. The most common wound types reported were serious soft-tissue damage or loss, burns, eardrum rupture, and fractures. From their data, the authors concluded:

1. Large numbers of bombing victims in a populated area will be taken to a hospital,
2. Most of those seen at a hospital have sustained minor injuries and will not be admitted,
3. The most common fatal injury is to the brain,
4. "Blast lung" from overpressure is uncommon in these types of civilian explosions,
5. The most common injuries noted above are sustained by those close to the blast, and most of those victims will require admission, and
6. The injury pattern varies with the environment of the explosion.[42]

Although such reviews are beneficial, salient points to disaster patterns can also be gleaned from studies that examine single events. A bomb containing 20kg of TNT exploded at 1025 on 2 August 1980 at the train station in Balogna, Italy. The explosion resulted in 291 injuries; seventy-three persons (25%) died at the scene, and eleven died of wounds within two weeks. Of 218 wounded, 181 (83%) were admitted; notably, almost all of them were admitted within 1½ hours from the time of the explosion.[43] Of the 107 patients admitted and studied, fifty-seven sustained superficial wounds, forty-three had head injuries, and thirty-eight had extremity injuries. Ear injuries occurred in fifteen and eye injuries in seven. Most patients sustained minor injuries as measured by the Injury Severity Score (ISS; the ISS is based on anatomic injury and is calculated by adding the sum of the squared scores on the abbreviated injury scale for the three most severely injured body regions[44]). Importantly this study reported admission stays, noting that hospital length-of-stays were zero to three days for twenty-six patients (24%); four to seven days for twelve (11%); eight to fourteen days for twenty-seven (25%); fifteen to twenty-one days for five (5%); twenty-two to twenty-eight days for one (1%); and more than twenty-eight days for twenty-nine patients (27%; seven patients were unaccounted).[45] Although this hospitalization stay data is only from one study, such information could be beneficial in planning both hospital bed requirements and evacuation requirements.

Review of the system-response to the bombing of the US Marine barracks at the Beirut Airport on 23 October 1983 will be discussed later. However, looking at the injury data here will put this information in context with other such studies. At 0630 on that date, a truck crashed into the atrium of the four-story airport terminal building housing 350 marines of the 24th Marine Amphibious Unit (MAU), whereupon it

detonated the equivalent of 12 tons of TNT.[46] The Battalion Aid Station on the ground floor was destroyed and its medical officer was killed.

The blast caused 346 casualties, of which 234 (68%) were killed immediately. Eight casualties went to a local hospital, where one died. Help on scene came from US Navy medical personnel flown in from off-shore ships, Italian and French military personnel, and the Lebanese Red Cross. Only fifteen of the casualties had minor wounds that were treated on site. The USS *Iwo Jima* offshore was the primary location for higher levels of care and received sixty-five patients soon after the explosion. Twenty of the most seriously-injured casualties in this group were flown immediately to the British R.A.F. Hospital at Akrotiri, Cyprus on a R.A.F. C-130, the flight taking only forty-five minutes; one victim died there. The remaining twenty-four victims were extricated and flown out to Cyprus and US Military Hospitals in Italy and Germany within six hours; one died enroute. Four deaths occurred later in the casualties taken to Germany. Therefore, of all evacuees, seven (7.3%) died. [47]

In reviewing the injury pattern of the eighty-five survivors, most (73%) had soft tissue injuries and bone fractures (51%). Thirty-seven (44%) sustained head injuries (four died), fifteen (43%) had chest injuries (two died), five (6%) sustained burns, five (6%) sustained abdominal wounds, five (6%) had eye injuries, and nine (11%) had peripheral nerve injuries.[48] Further review of the neurological injuries revealed the following:

1. Thirty-seven head injuries (twenty-eight concussions, twenty scalp lacerations, thirteen skull fractures, six facial bone fractures, four cerebral contusions, five dural lacerations, two cerebrospinal fluid fistulas, and two intracerebral hematomas),
2. Two spine or spinal cord injuries (one cervical and one thoracolumbar spine fracture associated with a deficit), and
3. Nine peripheral nerve injuries (one facial nerve palsy, two brachial plexus palsies, one median and one radial nerve palsy, and four peroneal nerve palsies).

Additionally, in looking at those survivors with either a scalp laceration or a concussion, 1/3 of them had an associated skull fracture.[49]

In most disasters, review of the casualty management reveals cases of "over triage", that is unnecessarily evacuating patients for higher levels of care, or "under triage", that is failing to move victims to the appropriate higher echelon of care. In the Beirut bombing, 77/96 (80%) were thought to have been over triaged, as measured by an Injury Severity Score (ISS) of less than sixteen. This figure compares similarly to 133/181 or 73.5% of survivors over triaged and evacuated with a ISS of less than eleven in the Balogna bombing incident. As for under triaged victims, as measured by failing to evacuate a patient with an ISS of greater than fifteen (greater than ten in the Balogna incident), none in either scenario were under triaged.[50]

In the evening of 25 February 1991, the warehouse in Dhahran, Saudi Arabia housing the US Army's 475th Quartermaster Group was struck by an Iraqi scud missile. This single attack killed twenty-eight servicemen, resulted in 110 hospital admissions, and caused 150 servicemen to suffer minor

physical injuries and/or subsequent psychiatric problems.[51] Review of this wartime scenario has clear implications for terrorist bombings, with several valuable lessons learned. Important findings in this study included:

1. Medical support planning must include military, civilian, and host nation assets,
2. Effective communication strategies affect the outcome of any MCI,
3. Medical regulation and patient tracking continues to require further improvements,
4. Accurate and timely casualty reporting is essential,
5. Basic first aid skills and supplies for all soldiers improve the response effort, and
6. Combat stress teams must be mobile and dedicated to reach those in need.[52]

Perhaps the most recent bombing event that received the attention of the American public was the Oklahoma City Bombing on 19 April 1995. A detailed retrospective review of medical examiner records, hospital records, physician surveys, building occupant and survivor surveys, as well as ambulance dispatches, media reports, and several other sources were used in one study to look at the injury and fatality patterns from the blast. The blast injured a total of 759 persons, of whom 167 died (case fatality ratio of 22%); 162 deaths occurred at the scene, three persons were dead on arrival at the emergency room, and two persons died of wounds on days two and twenty-three following admission. Of the remainder, 509 were treated as an outpatient and released (67% of the injured or 86% of the immediate survivors) and 83 were hospitalized (11% of the injured or 14% of the immediate survivors). The injuries were primarily soft tissue lacerations, abrasions, contusions, and punctures (74% to the extremities, 48% to the head, 45% to the face, and 35% to the chest) and musculoskeletal injuries (the most common fracture sites were the extremities, face and neck, and back, chest, and pelvis). [53]

Another study that looked at the Oklahoma City Bombing evaluated the impact on the emergency departments (EDs) in the city through a retrospective review of 388 available medical records at thirteen hospitals.[54] Following the explosion, the median time to arrival at the emergency department was ninety-one minutes with most making it by three hours. Patients who eventually were admitted to the hospital took longer to get to the ED than those who were treated and released. The mode of transportation was 56% by privately owned vehicle, 33% by emergency medical services, 10% by walking or being carried, and 1% by other means. Thirty-eight of these patients (9.7%) required extrication from the building, that is they could not independently free themselves from the blast debris. The median time for extrication that could be documented in thirty of these victims was twenty minutes (with a range of five to eight hundred minutes). The rescue phase was over in approximately three hours and only three living victims were extricated beyond that time. All of these patients were admitted. [55]

Prehospital treatment was documented in ninety patients (23%) in this study. The treatments included spine immobilization (71%), field dressings (44%), intravenous fluids (36%), endotracheal intubation (3%), advanced cardiac resuscitation medication use (3%), tourniquet application(2%), and field amputation (1%). Most (64%) of these patients who were treated in the field were admitted to the hospital, 28% to the operating room, 24% to a ward, 9% to the intensive care unit, and 3% were dead on

arrival. Once seen in the emergency department, the patient contact time was approximately one hour. The five most common procedures conducted in the ED were wound care, tetanus immunization, intravenous line placement, pulse oximeter use, and the administration of analgesics. If discharged from the ED, the most common diagnoses were laceration (30%), contusion (9%), fracture (8%), strain (6%), head injury (6%), and abrasion (6%). [56]

The data presented in these studies look at individual or small numbers of disasters caused by explosions of conventional bombs. Some results can be compared or contrasted between studies and events, such as injury patterns. However, some information such as time from extrication to arrival in the ED is not reported in all studies. Nevertheless, presentation of this data remains critical to planning for disasters caused by conventional explosive devices.

Summary studies attempt to look at trends in common data reported in several reports. One such review that was published in 1988, prior to the scud missile attack and Oklahoma City Bombing studies just reported, looked at fourteen studies of terrorist bombings from 1969 to 1983. The study includes information on 220 worldwide incidents that caused 3357 casualties.[57]

In the 220 incidents reviewed, the average number of victims was 15.3 casualties/incident. There were 423 (12.6%) persons who died prior to receiving any medical care. In these events, 2934 (87%) of the victims immediately survived, and of these, 881 (30%) were admitted. Forty (1.4%) of the immediate survivors eventually died. Of the 1339 casualties with sufficient data to review, 18.7% were deemed critical (range 7.6-34%) and 45.5% were admitted. Overtriage (defined in this paper as the "proportion of noncritically injured survivors hospitalized for immediate care"[58]) was 59% (range 8.3-80%). Conversely, there was only one single case of possible undertriage. Head injuries were the predominant cause of immediate (71%) and late (52%) deaths; however, abdominal injuries had the highest specific mortality rate (19%) of any single injured body system in the immediate survivors. Records of 812 survivors showed that the surgical procedures were categorized as soft tissue in 67%, bone in 17.5%, abdominal in 5.5%, head in 2%, and miscellaneous in 8%.[59]

In the discussion of this paper, in addition to the information presented here, the authors noted the following:

1. the number of immediate deaths is directly proportional to the explosion size, the explosion occurring indoors, and the building collapsing,
2. the immediate deaths are primarily a consequence of injuries to first, the head, and second, the chest and abdomen, and
3. "disaster planning should include provisions for emotional evaluation and rehabilitation of casualties."[60]

The above studies mention, though do not discuss in detail, the extent of psychiatric casualties in terrorist bombings. "Existing response paradigms have lacked the appreciation of emergency-phase psychological needs of casualties. Disasters may result in large numbers of casualties who require

emergency psychological support."[61] Failure to recognize such victims and improper management of them may result in many patients suffering from both acute and delayed stress disorders.

Society believes that money and therapy will heal those who suffer psychological wounds from the disaster. However, as a whole, its patience and understanding is limited. "When the wounds do not heal quickly, the phenomenon of blaming the victim can emerge. In this phenomenon, the victim's situation is viewed as unique or is tied to personal characteristics or responsibility, and thus, is not deserving of large-scale or long-term support from society."[62]

Individuals exposed to the trauma of bomb disasters normally undergo predictable behavioral and psychological changes over a well-described time course. The experiences tend to be short-lived, though may linger and reoccur with reminders. Paradoxically, suffering through such an event may improve their psychological health, that is the disaster "...can become the center around which a victim reorganizes a previously disorganized life, reorienting values and goals."[63] Specific psychiatric diagnoses that may appear in response to a disaster include:

1. Organic mental status changes due to head trauma,
2. Acute stress disorders,
3. Adjustment disorders,
4. Difficulties with substance use,
5. Major depression,
6. Posttraumatic stress disorder (PTSD).
7. Generalized anxiety disorder, and
8. Psychological factors affecting medical disease or injuries.

In addition, specific psychological or behavioral responses can occur as well, such as grief reactions, and family violence.[64] In the 6-12 months following a disaster, major depression, substance abuse, and adjustment disorders such as anxiety and depression are not uncommon. These problems reflect the "survivors' reactions to their injuries, to affects and feelings stimulated by the disaster, and/or to their attributions of the cause of the disaster."[65] Single parents may be at great risk for developing such disorders because they may lack support structures following the disaster. [66]

The time course for the development of psychiatric changes has been broken into four phases:

1. Phase 1 – Immediate. In this phase the victims display strong emotions with fear, disbelief, confusion, and numbness. Supporting individuals include family members, neighbors, work colleagues, and rescue personnel.
2. Phase 2 - Week one through several months. Here denial alternates with intrusive symptoms. Usually distracting feelings of a heightened startle response, hypervigilance, insomnia, and nightmares occur. Later, denial occurs, accompanied by somatic complaints, withdrawal, anger, and increased physician visits.

3. Phase 3 – Several months to one year. Oftentimes in this phase, the victims become disappointed or resentful at "the system" for not meeting their needs. Support from the community often wanes as individuals return to their personal lives.
4. Phase 4 – Years following the event. This reconstruction phase involves resolution of the psychological and somatic symptoms that previously occurred "through reappraisal of the event, assignment of meaning, and integration into a new concept of self."[67]

Lay persons and primary care providers will do much of the early psychiatric care of victims exposed to a terrorist bombing. In concert with mental health workers, many interventions can be done immediately after the disaster. Foremost is to provide a safe location for respite and recovery. Providing sleeping medications, reality orientation, and encouragement for victims to discuss their feelings can treat many postdisaster stress symptoms. High-risk groups need formal counseling. Finally programs to reach victims who suffer but fail to seek help will be critical to decreasing chronicity.[68]

Mental health professionals normally manage late postdisaster psychiatric interventions. Correctly identifying the victim's problems in the long differential diagnostic list above will guide therapy, which may include psychotherapy, medications, or media-based education and recovery. A primary role of mental health workers in both the immediate and long-term follow-up of disaster victims is also to educate the affected organizations and primary care personnel. Failure to recognize, identify, and treat psychiatric casualties of a disaster leads to long-term, costly, and disruptive consequences, not only for the individuals, but also for their families and coworkers.[69]

Under recognized, or perhaps often disregarded, is the psychological impact of terrorist bombing on rescue workers. Stress on disaster workers comes from three primary sources. The first is the event itself, that is the environment of the disaster. Secondly, stress comes from the job they perform, such as heavy responsibility and conflicting roles they play in the response. Finally, stresses arise from the organization, typically from organizational conflict and the individual's role in the organization.[70]

Signs of stress in aid workers, although at times hidden by the urgency of the response effort, eventually unmask themselves. Common signs include, depersonalization, "gallows" or "black humor," hypervigilance, or an unwillingness to remove themselves from the rescue effort.[71] Treatment and prevention are not unlike that discussed above for the victims. Recognizing the need and taking the time often mitigates the effect. Most commonly the treatment effort includes a "critical incident stress debriefing" (CISD) or the American Red Cross' (ARC) "multiple stress debriefing model." Most aid workers find such briefings challenging but helpful. However, neither CISD's or the ARC's model have been formally evaluated in systematic studies.[72]

PREDICTABLE EFFECTS/DISASTER MODELING

The data presented here clearly benefits medical planners who look at tailoring a medical response to a bombing disaster. Yet the information is historical and cannot often be extrapolated to specific

scenarios. Technology today permits accurate computer modeling of the effects of bomb blasts and may also be helpful in predicting injury patterns.

One product that has been developed, Blast/FX™, has its origins in US Air Force models that looked at the threat of conventional weapons against their airbases. The intent of the early system in 1989, labeled "Threat Related Attrition System" (THREAT), was to assist in planning for personnel and medical needs in the event of a bombing or other attack. THREAT remains in use for air staff planners to support the Joint Operational Planning and Execution System (JOPES) and the Wartime Manpower and Mobilization Planning System (WARMAPS).

With the advent of large explosive attacks against US Federal Buildings and assets, the Federal Aviation Administration (FAA) became interested in looking at the vulnerability of airport facilities. The FAA selected the THREAT software, specifically the Facility Model component, to evaluate select buildings. The current product in use, Blast/FX™, enhances THREAT and is used throughout the federal government, but primarily by security and engineering personnel to evaluate the safety of individual buildings.[73]

However, building disaster modeling could clearly benefit medical professionals as well. With the use of building drawings or evaluation by a site survey, and estimated person densities and locations within the buildings, injury patterns from blast, fragmentation wounds, flying glass, and building collapse can be predicted for a given bomb scenario. This data can then be extrapolated to other programs that can predict specific injuries, the change in injury over time, and the personnel and supply resources needed to treat these casualties. Finally, given this information, models for medical evacuation can also be built.

Naturally the validity of the data must be examined. Building this model entailed the use of many DOD assets that looked at the blast effects of different explosive devices against a variety of building materials. Injury patterns were derived from both human and animal models, as well as a review of historical data. Modeling disasters that have occurred, such as the Oklahoma City Bombing, provides reality-based testing of the program. For example, in that bombing that caused 167 deaths, the model predicted 116 with fewer injuries from the building's collapse than really occurred. Other scenarios produced a higher prediction than really occurred. Overall, the injury accuracy has normally been +/- 25%.[74]

DISASTER RESPONSE PLANS

PLANNING CHALLENGES

The consequences of disasters, particularly those resulting from explosive devices, are predictable based upon the information outlined above. However, the use of that information to prepare a medical response often becomes problematic, particularly as the response broadens and crosses departmental and agency boundaries. "Most disaster response problems are not failures of the individual. More often

they are *system problems.* That is, the usual organizational systems (procedures, management structures, and designation of responsibilities) established by various organizations to cope with routine, daily emergencies are not well adapted for use in disasters."[75]

Unfortunately, little is written about such system faults. Coordination among agencies and their communication of information is usually the biggest problem facing a multi-agency disaster response. [76,77] For example, using a mock extortionist threat to detonate a nuclear device at the Summer Olympics in Atlanta in a multi-agency exercise in 1994, major weaknesses were identified in the cooperation between agencies whose priorities and incentives conflicted. In this exercise, the FBI focused its efforts on identifying and capturing the terrorists while the Department of Energy and DOD were most concerned with disabling the bomb.[78]

Most disaster planners in the developed world normally expect a high quality of care for most victims. However, in addition to system problems, disaster planners now must contend with events occurring in the developing world where medical standards and resources fail to meet the needs of victims. MCIs commonly occur in "austere environments, ...a setting where resources, transport, access, or other aspects of the physical, social, and economic environment impose severe constraints on the adequacy of immediate care that can be delivered to the population in need."[79]

Sudden impact disasters, such as a terrorist bombing, can be thought of as occurring in a time sequence of five phases: 1. Inter-disaster, 2. Pre-disaster or warning, 3. Impact or detonation, 4. Emergency response or relief, and 5. Rehabilitation or reconstruction. [80] Development of a comprehensive response plan should take place following such a disaster, during the rehabilitation phase, or prior to the next one in the inter-disaster phase. The interest to generate such a plan is "... proportional to the recency and magnitude of the last disaster."[81] Notably this is also the best time to submit plans for funding.

Unfortunately, once the reconstruction is well underway, such planning begins to wane. "People are unlikely to give priority attention to an unlikely future disaster when there are fifteen tasks to be accomplished by Friday."[82] This perspective, in the current setting of limited governmental resources, often results in an apathetic response to disaster planning. In order then to accomplish such a task, disaster preparedness proposals must be cost-effective.

Planning in detail for a disaster and all of its possible outcomes produces an overwhelming task that is doomed to incompletion. In contrast, planning for disasters of moderate size have a better chance of funding, are more likely to be rehearsed, and have a higher probability of occurring. Such model disasters should include approximately 120 casualties, for disasters of this magnitude will pose most of the inter-organizational dilemmas that occur in larger events.[83] Ideally, the plan and management structure should allow for a modular expansion of response "...as the incident (and the number of resources that need to be coordinated) grows in size."[84]

NOTIONAL PLANS

Once the intent to develop a plan matures and becomes a priority for an organization, what ensures its successful application when the disaster occurs? Unfortunately, planning for a disaster response is merely an illusion unless "... it is based upon valid assumptions about human behavior, incorporates an inter-organizational perspective, is tied to resources, and is known and accepted by the participants."[85]

Completion of a written plan is often deemed the end-state of the disaster-planning process. The written product, although a template for action, fails to demonstrate adequate preparation unless it is accompanied by training. Through training, the plan validates what people are "likely" to do rather than what they "should" do.[86]

Focusing on an inter-organizational perspective poses another significant challenge to disaster planning. Many agencies plan their response in isolation within their own organization, failing to coordinate their efforts with others that will participate in the response. For example, FEMA's plans for a disaster within the US must incorporate all agencies highlighted in the 12 ESFs. Similarly, DOS, as the lead agent in coordinating the response to an incident overseas, must work closely with DOD's Unified Commands' Commanders in Chief (CINCs), the Department of Justice and FBI, DHHS, and others. Disaster plans conceived by any agency will be ineffective unless all of the involved organizations are aware of the plan and their role in the response.

One successful model for disaster planning comes from the fire fighting community in Southern California. Congress chartered the project, called FIRESCOPE (Firefighting Resources of Southern California Organized, for Potential Emergencies) in 1972 after a series of severe wildlands fires. Its design coordinates the processes for multi-agency fire operations (see Figure 1 below). Under this FIRESCOPE model, the Board of Directors, composed of agency directors, set the policies or guidelines for the plan. The Operations Team of agency operations chiefs implements the decisions and propose recommendations for change. Supervisory, operations-level officers conduct most of the general staff work and analysis at the Task Force level. They, in turn, use a variety of subject matter, technical experts to aid in their analysis. An individual (Coordinator) who reports directly to the Board of Directors and who is not influenced by any single agency ideally coordinates the entire process.[87]

Although disaster planning is fraught with a multitude of challenges, "...the *process* of planning is more important than the written product that results."[88] The personal contacts and familiarity of individuals within the organizations participating in the disaster planning all contribute to a modicum of success. Unfortunately with the frequent turnover of individuals within the organizations, particularly at the federal level, the mistakes of past disaster responses often reoccur.

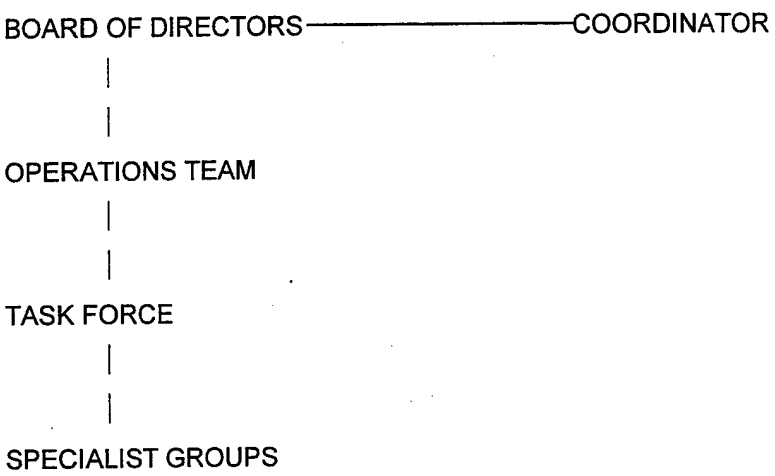

FIGURE 1 THE FIRESCOPE STRUCTURE FOR EMERGENCY AND DISASTER PLANNING[89]

DISASTERS VS. EMERGENCIES

Every organization plans for, and often experiences, a variety of emergencies. Yet disasters usually stress normal, organizational structure and procedures beyond their design capabilities. Table 4 delineates some common differences between routine emergencies and disasters.

ROUTINE EMERGENCIES	**DISASTERS**
Interaction with familiar parties	Interaction with unfamiliar parties
Familiar tasks/procedures	Unfamiliar tasks/procedures
Intra-organization coordination	Intra- and inter-organization coordination
Intact communications, roads, etc.	Disrupted communications, blocked roads, etc.
Intra-organizational communications	Inter-organizational communications
Familiar terminology	Unfamiliar, organization-specific terminology
Local press attention	National/international media attention
Management adequate for resources	Resources overwhelm management capacity

TABLE 4 DIFFERENCES IN DISASTERS[90]

When disasters occur, especially at the federal level, the involved agencies often come from different locales and have differing and competing interests in managing the disaster. Mutual working arrangements usually have not been pre-arranged and tend to develop during the crisis. The decision-makers in disasters tend to come from lower levels in the organizations' hierarchy, resulting in their

organizations using only familiar procedures, "... sometimes failing to see or find out how their role fits into the *overall* response effort. This has been called by some the '**Robinson Crusoe Syndrome**' ('We're the only ones on the island.') This narrow focus on one's organizational goals has been observed not only in disaster response, but in planning as well."[91]

Early situational analysis is often incomplete in disasters. This breeds uncertainty from which the fallout includes unclear damage estimates and unknown secondary threats (e.g., leaking hazardous materials, structural weakness, etc.). Subsequent actions then become based upon these vagaries. The damage assessment also changes with time, thereby further complicating response actions. Additionally, the process to update the situation is often not executed by one individual or organization, or may not even be completed. Problems that arise early in disasters result in a multitude of issues that further complicate the response. Examples include communicating between agencies (such as equipment, procedures, and terminology variability), developing casualty lists, providing security, conducting mortuary affairs, managing volunteers and donations, controlling air space and traffic, etc.[92]

INTERAGENCY COOPERATION

Interagency communication and coordination challenges normal emergency responses in disasters. Most agencies tend to model their organizational and emergency responses along the typical military model of command and control, that is, centralized control under a single commander and decentralized execution. However, "... realistic disaster management in a country with a decentralized government such as the United States, with its traditional preferences for local control and private enterprise, probably cannot be accomplished using a military model. Rather, coordination among various independent responding organizations needs to be based on negotiation and cooperation."[93]

The cooperation needed in disasters is best demonstrated in the development of pre-disaster planning with parties of all agencies, emergency operations centers, and the Unified Command structure of the Incident Command System. Efficient disaster response and multi-agency cooperation develops by conducting joint planning and training, coordinating the division of labor and responsibilities, agreeing to common communication terminology and procedures, and fostering informal contacts. [94] Knowledge and comfort with others in the disaster-response team promotes an opening of communication glitches in terminology, equipment, and most importantly, the desire to share critical information ("who else needs to know?"). It is these less-formal procedures that advance an effective disaster response, for pre-existing personal, political, and jurisdictional disputes (more commonly known as "turf" or "sandbox" issues) impede multi-agency cooperation.

INCIDENT COMMAND SYSTEM

The current system that coordinates multiple agencies from many organizations in disaster response is the Incident Command System (ICS). The ICS, like the FIRESCOPE disaster-planning

model, has its origins in firefighting organizations. It began in the autumn of 1970 following a large number of fires in Southern California. In thirteen days, the fires destroyed 600,000 acres, 772 structures, and caused sixteen deaths. The thirteen largest fires crossed federal, county, and city jurisdictions simultaneously. Following this disaster, the US Forest Service reviewed and analyzed the efforts of the responding federal, state, county, and city organizations. This 1971 project identified six major problem areas that impeded an efficient response effort:

1. Lack of a common organization,
2. Poor on-scene and interagency communications,
3. Inadequate joint planning,
4. Lack of valid and timely intelligence,
5. Inadequate resource management, and
6. Limited prediction capability.[95]

The ICS's basic foundation includes autonomy of the agencies, management by objectives (MBO), unit integrity, and functional clarity (e.g. operations does not work logistics issues).[96] In addition, ICS needs an effective span-of-control, modularity to the organization, common terminology, integrated communications, and comprehensive resource management. [97] Contrary to suspicion, ICS is not an organizational tool that relies upon "decision by committee." However, it is a team process which "... by means of sharing of objectives and priorities, formulates a set of collective directives to address the needs of the entire incident and which reduces duplication and omission of crucial tasks."[98]

Although the fine details of how an ICS is structured may vary depending upon the disaster or the involved agencies, the backbone of an ICS is normally constant, containing five functional areas. An incident commander in the command section directs the coordination of the response effort. This section may also include information or media personnel, safety officers, and a variety of liaison officers. The ICS then breaks into four primary sections: finance, logistics, operations, and planning. Each section may again vary somewhat depending on the member agencies and the characteristics of the disaster. However, most disaster response agencies that develop an ICS use this structure. Most important to the organizational structure is that the command structure includes representatives from all levels of government. Some overlap of responsibility may occur, but its presence ensures that the Unified Command covers all issues and that agency autonomy can be maintained.[99]

By far, most emergencies that occur do not require the development of a full, multi-agency ICS. However, "...about 5% of all emergencies, [are] serious enough to require the response of several agencies, each with its own legal obligation to perform some type of action, not just to assist its neighbor. It is in these critical, multiple involvement emergencies, that Unified Command is called for."[100] "Unified Command", as the name implies, ensures a smooth flow of information, develops a single, collective approach to the incident, simplifies functional and geographical disparities, optimizes efficiency, and minimizes duplication of effort.[101] Its structure includes leaders only from agencies with statutory

responsibility for the event; supporting agencies do not have leaders in the command structure. Additionally, the agencies that assign commanders must be willing and able to support the command's objectives. Ideally, ICS specifies a Unified Command of no more than eight individuals, for group effectiveness begins to deteriorate beyond that number. [102]

Critical to the Unified Command in ICS are the details of the planning process. Each agency commander must articulate his/her objectives. Although separate, diverse, and perhaps conflicting, the objectives do not need to be forced into a consensus order at the direction of a committee. The team must, however, openly share and prioritize collective directions for the entire incident response in order to effect a positive outcome. [103]

LOGISTIC SUPPORT

Historically, disasters imply a condition of great resource needs, and oftentimes they do. However, receiving too many resources at a disaster site is a common problem in many disasters. The disaster site may be ill prepared to handle this great influx, and thereby cause limited personnel, equipment, or space resources to be dedicated to managing these donations rather than directly supporting the response effort. Such issues often arise when one organization assumes that another organization is in dire need of resources and places an urgent request for aid without confirmation.[104] This example further points to the overall issue of accurate damage assessment and resource management at a disaster.

Determining needs for a disaster response, so-called "needs assessment," involves two major processes, situational and resource analysis. Situational analysis can be accomplished by disaster-assessment teams, studying media reports, evaluating weather reports, checking reconnaissance information, etc. It should look at present conditions, expected conditions, and the impact of those expected conditions. [105]

In order to assess the resource needs, resource analysis must include the disaster's response objectives, the resources needed to accomplish them, the resources that should be available, and those that are available. Analyzing these needs becomes very difficult, for often resources that were not requested arrive at the scene, many separate organizations request similar supplies, and an organization designated to track needs is often not apparent.[106]

TRIAGE

Triage issues always arise in every disaster. Where disasters are limited in scope and geographical area, every patient should be triaged to receive the optimal treatment for his/her problems; adequate resources for such treatment are presumed to be available. However, in MCIs, the objective of triage changes to "do the greatest good for the greatest number of people."[107]

Although most health-care providers prefer to manage victims in a hospital, field triage will occur because of two reasons. The first is that the first responders will be the local populace who treat and manage an overwhelming number of casualties with limited resources. Secondly, in a sudden-disaster event, medical personnel will also gravitate to the scene and begin treatment there.[108]

Triage problems that occur on scene result in poor casualty distribution among treatment facilities. Bypassing lower levels of care oftentimes results in simple movement of a MCI from the disaster scene to the hospital. The causes of such problems are multi-factorial, but include the patient movement by non-Emergency Medical System (EMS) resources, lack of inter-organizational planning, inadequate needs assessment, poor on-scene medical direction, and poor communications from the scene to the hospitals.[109]

Scene safety and responder qualifications also complicate triage efforts. Most sudden-impact disasters take place in relatively controlled environments, that is, once the explosion occurs, the scene permits rescuers to immediately begin their work. Rescue efforts in this permissive environment, safe from building collapse or from persons targeting the rescuers at the scene, remains an unrecognized factor in disaster response planning, particularly among medical personnel. Physicians are normally trained to provide thorough care to the sickest patients in the safety of a hospital; on the contrary, pre-hospital care providers normally work under relatively austere conditions, emphasizing scene safety first. Therefore, problems can often occur when physicians extend their care philosophies into the disaster seen. The result may be that health-care workers unnecessarily risk their own safety, or the safety of others working for them, in their haste to begin patient care.[110] "With the advent of modern terrorism, the principles of triage and scene safety must be applied without exception. We as a society must acknowledge that although our public servants knowingly put their lives on the line every day, it is incumbent on their supervisors to not place them at undue risk."[111]

PUBLIC RELATIONS

Problems with the media oftentimes result from failure to plan for their presence and involvement. They will be present, so failing to plan for media relations predisposes to problems that could disrupt the disaster response. Normally the media will always want the same information, i.e., casualty information, property damage, disaster response and relief activities, other characteristics of the crisis, and theories on the cause of the disaster.[112]

Effective media management in a disaster follows several important concepts. The first is that silence, or the lack of releasing information, is looked upon by the media and public with suspicion. Information must be released as soon as feasible, especially within the first twenty-four hours. Once safe, access to the site becomes a goal for the media and needs to be granted as soon as possible. Speculation and opinion by spokesmen results in mistrust by the media and their audience; questions that cannot be truthfully answered should be researched before release. Finally, after the media begins to

release their story, the leadership of the response effort must monitor both the truthfulness of the story and the reaction by the audience.[113]

HISTORICAL REVIEW OF AN OVERSEAS DISASTER RESPONSE; THE LEBANON BOMBING

On 23 October 1983, the US Marine barracks at the Beirut Airport was destroyed by a suicide terrorist who drove his vehicle into the first floor of the building, whereupon it detonated. The medical details of the casualties and patient flow were discussed previously. However, with so many victims and the United States' vulnerability exposed to the world, the Secretary of Defense directed the Assistant Secretary of Defense (Health Affairs) on 20 January 1984 to "...conduct an independent review of Medical Readiness Planning in the U.S. European Command (USEUCOM). He directed that, 'As a minimum the review should cover medical command and control, medical evacuation, the adequacy of medical planning and communications, arrangements with friendly nations for hospitalization and evacuation support in the event of mass casualties, and planning for medical responses to terrorist attacks....'" [114]

This event occurred at the Beirut Airport and hence, the response normally would have been coordinated through the Department of State. However, with only DOD personnel involved at a DOD installation in a combat zone, the medical response to this bombing was managed entirely with DOD assets and coordination (with the exception of the local national hospitals that assisted). Because the bombing took place in the USEUCOM's area of responsibility, the USEUCOM Surgeon's Office had primary oversight of the medical response, and hence was the focus of this study. Reviewing the significant findings of the Medical Readiness Review Group highlights the challenges that were present in DOD in 1983 during the Cold War and provide a measure of historical reference. In addition, the recommended changes similarly reveal the progress, if any, that has been made.

The findings were divided into two major categories and are outlined in Table 5 below. In paralleling the findings, the recommendations of the committee are in Table 6.

One response of the delayed support to the forces in Beirut, was the development of USEUCOM-based, USAF "Flying Ambulance Surgical Trauma Teams." The first one organized in Weisbaden, Germany and later teams formed in Torrejon Air Base, Spain, Lakenheath, U.K., and Incirlik, Turkey. By 1991, the requirements for these teams included[115] the capability to deploy within two hours, carry no lab or x-ray, and care for fifty casualties of an expected NATO triage distribution (20% immediate, 20% delayed, 40% minimal, and 20% expectant). The personnel included a general surgeon, an orthopedic surgeon, a flight surgeon to serve as triage officer, an anesthetist, an operating room nurse, four general nurses, three operating room technicians, six medical technicians, and two paramedics. Their equipment needed to fit on one pallet and they were to be self-sustainable for twenty-four to forty-eight hours.

RESOURCES	PLANNING
Wartime surgical capabilities will be inadequate	USEUCOM has no effective joint command and control for medical planning or resources
The planning, programming, and budgeting system assigns medical readiness a low priority	Each of the service components' medical evacuation plans conflict with one another
The medical logistics system could not support a wartime operation	No plans exist in the services for joint use of medical resources
Medical unit readiness is low	No effective joint medical plans exist for terrorist attacks
Combat-zone host-nation medical assets would be unavailable in wartime	
USEUCOM cannot medically support chemical or biological casualties	
USEUCOM medical planning elements are understaffed	

TABLE 5 MAJOR FINDINGS IN REVIEW OF THE MEDICAL SUPPORT TO THE LEBANON BOMBING[116]

RESOURCES	PLANNING
Accelerate procurement of wartime surgical capabilities	Establish joint command and control over medical planning and resources
Unify the services' medical supply system	Revamp the aeromedical evacuation system to establish clear procedures and avoid redundancies
Improve medical unit readiness	Direct joint utilization of medical resources in wartime
Direct maximal efficiency of the aeromedical evacuation system	Develop joint medical plans for terrorist attacks
Increase aeromedical evacuation resources for wartime use	
Rapidly establish host-nation support agreements	
Increase research and development in providing medical support for chemical/biological warfare	
Provide adequate medical planning staff	

TABLE 6 MAJOR RECOMMENDATIONS IN REVIEW OF THE MEDICAL SUPPORT TO THE LEBANON BOMBING[117]

Review by the committee determined that in spite of the challenges faced in medically supporting this terrorist event and the findings outlined above, no lives were lost as a result of "system" problems, such as the fragmented aeromedical evacuation response. Major recommendations were made, and some have been instituted. However, unique characteristics of this event that must be considered in comparison with other overseas terrorist events include:

1. Lebanon was a DOD- and USEUCOM-only event. With rare exception, only one major federal agency, in one Unified Command responded to the incident, thereby simplifying, to an extent, the command and control issues surrounding the response effort.
2. Although somewhat isolated on the airfield and under constant threat (in August 1983 the Marines had come under hostile artillery and sniper fire, killing seven and wounding others), support forces were in the immediate area. These forces, principally off shore, provided security, accurate damage assessment (which assisted in the request for more support), immediate medical response, monitoring of those treated in host-nation facilities, and assistance in the medical evacuation process to US and friendly forces' medical facilities.
3. Excellent medical facilities in the host nation and at friendly forces' medical treatment facilities were in the immediate area and fully used.

DETAILED REVIEW OF THE KENYA EMBASSY BOMBING

TERRORIST EVENT AND IMMEDIATE RESPONSE SUMMARY

The bomb that exploded outside the Kenya Embassy at approximately 1035 on 7 August 1998 sent the Federal Government into a crisis response to secure the Embassy and its staff, search for the perpetrator of the crime, and save lives. Although many of the events surrounding the multi-disciplined response were intertwined, this review looks solely at the medical response in detail.

When the bomb detonated, "the medical unit personnel [one physician and one nurse practioner], housed in the first sub-basement less than 30 yards from the bomb blast, [were] miraculously spared the devastation, and injuries other areas of the Embassy suffered."[118] This permitted the medical personnel, including the Foreign Service Medical Officer at the Embassy, Dr. Gretchen McCoy, to render aid, establish medical triage stations, orchestrate the medical response of other local and US Government medical professionals in the area, and oversee the medical evacuation of the injured.[119]

Within an hour, a US Army physician and two Medical Service Corps officers from the US Army Medical Research Unit (USAMRU)– Kenya, located three miles from the Embassy, arrived at the scene to assist the effort. They provided primary care, searched the local hospitals for US casualties, assisted the triage and stabilization of US patients for evacuation, helped in the coordination between the embassy and evacuation flights, and aided the Kenyan medical officials with their medical support priorities.[120]

The surviving victims' injuries included primarily facial and extremity fractures, as well as shrapnel wounds from metal and glass debris. Many of these injuries occurred when individuals moved to windows to see the activity surrounding gunshots and grenades at the gate immediately prior to the bomb detonation. Other persons also experienced closed-head injuries, lung contusions, eye injuries, and eardrum perforations. [121] Fortunately the embassy sustained little structural damage, being made primarily of reinforced concrete. Most Kenyan national casualties occurred in the collapse of the adjacent Ufundi Building. Those who were alive and injured were removed from the building within several hours; all of those alive upon removal survived, whether or not they were evacuated. Those who died appeared, from autopsy information, to have died immediately from severe, non-survivable injuries, including central nervous system injuries, cardiac and great vessel lacerations, liver damage, and bilateral lower extremity amputations. [122]

As in many African cities, numerous small medical clinics, nursing homes, and other medical facilities provide medical care in addition to the hospitals. All were possible locations for the victims. Kenyan and American-injured employees were transported to at least six different locations within the city. American medical and embassy personnel finally located all of these victims, as well as the unaccounted, alive and uninjured employees, within three days, only by personally sweeping through the medical facilities and morgues in the city.[123] This process was lengthy and made more problematic because of virtually non-existent telephone communications, lack of street addresses in Kenya, and the chaos of the moment.[124] Much of the coordination was necessarily done at night when radio and road traffic was at a minimum.

In order to assist inpatient tracking, the medical personnel sought to have, at a minimum, the critically injured victims transferred to the Nairobi Hospital. Placing these patients in a central location not only made monitoring easier, but also permitted the embassy personnel to work closely with a hospital staff with whom they were familiar. The medical personnel also followed the stable victims in outlying facilities and clinics until they could be medically evacuated for further care. This "patient administration" was only accomplished through the coordinated efforts of the medical personnel of the embassy, the USAMRU, the Centers for Disease Control and Prevention who had a physician in Nairobi doing research, and volunteers from the Peace Corps (including one physician) who also were in Nairobi.[125]

Notably, the medical care and positive outcome of the patients from this bombing was due, in large part, to the critical care management and surgical capabilities of the local hospitals. Their excellent support, in addition to their use of the English language, facilitated a positive outcome, even with the eventual arrival of DOD's medical treatment and evacuation assets.[126] One of the local physicians noted that most of the cases he saw had minor injuries requiring only basic suturing under local anesthetic. However, many of those who were more seriously wounded did not receive timely care because of the lack of an emergency medical management system that would have potentially placed experienced health-care workers at the scene. This system also would have permitted more effective triage and

increased the use of ambulances for more serious cases. [127] Nevertheless, given the degree of devastation, the positive outcome was remarkable.

SUMMARY OF ISSUES/PROBLEMS THROUGH PHASES OF THE DISASTER RESPONSE

PLANNING PHASE

Terrorist threats against US interests abroad persist and warrant adequate preparations. Although risks cannot be eliminated, their effects can be minimized. Thorough Emergency Action Plans (EAPs) should address the major perceived and realistic threats. For example, the Nairobi EAP did not anticipate a car-bomb scenario, a threat of historical precedence. Additionally, intelligence reports at the time alleged threats against overseas US interests, including the Nairobi embassy.[128] Taken together, failure to look at these threats was costly. Intelligence reports, although disseminated throughout the intelligence community and to selected posts, are not uniformly shared with medical personnel (either because those with the information do not believe medical personnel have a need to know, or, medical personnel do not seek out such information). Even though these reports are beneficial, they cannot be assumed to be available, for unfortunately they often do not precede terrorist attacks. [129]

With no planning and little, if any warning, the explosion resulted in mass confusion and chaos. No significant training or contingency planning for mass casualties had been completed, and hence the response was happenstance at best. Major failures occurred in planning, logistical support, and DOD transportation. Some of these problems could have been obviated with better pre-event coordination and liaison with designated points of contact. [130]

Medical command and control also had never been contemplated. Nairobi, Kenya sits in USCENTCOM's area of responsibility, but virtually all medical support relies on USEUCOM assets. No formal cross planning between these Unified Commands and DOS in Nairobi had occurred, nor had any planning for medical oversight on the ground taken place. Any medical planning that did occur took place in isolation, "stovepiping" information in medical channels.

ASSESSMENT PHASE

A major difficulty that occurred in mounting the US Government's response was the ability to quickly ascertain the extent of injuries to US citizens, and to determine exactly what response was needed. Fortunately the medical officer of the embassy was not injured and was able to assume the role of lead medical advisor on the ground. Communications were disrupted, but she was able to provide some damage and needs assessment to the Department of State's Medical Director, Dr. Cedric Dumont, in the DOS' Emergency Operations Center (EOC). It was from this EOC that other federal agencies were alerted and the Department's Medical Services orchestrated the medical support to both embassies and the medical evacuation of the wounded.[131]

DOD's medical assessment was more convoluted and fragmented. At the time of the blast, the defense military attaché from the embassy was out of the country and the other DOD personnel were either killed or wounded. LTC Bonnie Smoak from the USAMRU in Nairobi was the senior military medical officer on scene and assisted Dr. McCoy in working with DOD and its medical response.

As the Nairobi event took place in US Central Command's Area of Responsibility, the USCENTCOM Surgeon's office contacted LTC Smoak to glean from her the necessary medical supplies for US and local national victims. Many of these same questions and requests were necessarily repeated through the USEUCOM Surgeon's office, as USEUCOM, a supporting Unified Command, had the readily available assets to respond.[132] Additionally, much of this same information had also been transmitted through Dr. McCoy to the DOS' EOC.

Having experienced terrorist events in the past, the federal response quickly mobilized. DOS, through its EOC, activated its Foreign Emergency Support Team (FEST; it included no medical personnel), which departed within approximately six hours from alert. This team is designed to rapidly deploy to a disaster location, secure US assets as needed, assess the damage and needs, and coordinate the response effort. Unfortunately, unexpected delays of over thirteen hours, including a plane breakdown in Rota, Spain, resulted in the FEST arriving about forty hours after the explosions. Additionally, the FBI, CIA and DOD EOCs were notified, who in turn mobilized their personnel to determine the next courses of action.[133] However, liaison between the agencies was "disjointed."[134]

DOS' Medical Service sent DOS Foreign Service medical personnel to Nairobi and Dar Es Salaam from embassies in Pretoria, Kampala, Vienna, and Athens. Working with the Bureau of Political and Military Affairs, they also orchestrated the military transportation for medical assistance.[135]

Interagency cooperation at the scene was excellent. Interaction between the DOS medical staff and DOD staff from USAMRU were especially complementary. Each assisted one another, ensuring all aspects of patient care, tracking, evacuation, etc. were completed. This cooperation became more essential with increasing fatigue and sleep deprivation by all medical personnel on scene.[136]

RESPONSE PHASE

Large numbers of personnel from Washington and elsewhere arrived in Nairobi as part of the rescue and response effort. These individuals came from many federal agencies in addition to services within DOD. Inevitable coordination problems arose, particularly in the medical response. DOD did eventually develop a Joint Task Force with an Air Force Lieutenant Colonel as its surgeon to oversee the JTF's medical operations. However, ultimately the Ambassador was in charge.[137] As such, her senior medical officer or DOS' designated senior medical officer was ultimately in charge of overseeing the medical response efforts on the ground. This "command" relationship was often not fully realized by the arriving DOD medical assets.

Early in the response, DOD flew seventeen air sorties from Washington, DC, the Middle East, and Germany with 418 passengers and 140 short tons of equipment. Air movement was clearly limited by the distances involved. Additionally, assembling teams from a variety of agencies complicated normal deployment procedures. In an early DOD press briefing, Kenneth Bacon emphasized the timeliness of DOD's response through its immediate shipment of over 200 units of blood.[138] However, of note, this blood was shipped without an adequately demonstrated need and provided an additional burden for medical personnel on the ground to orchestrate the delivery of this blood to the local medical facilities. [139]

DOD medical response units came from throughout the region. The first to respond, the 4404th Wing (Provisional) in Southwest Asia, deployed on a C-130 a thirteen member security team and twelve member Medical Assessment Team, including physicians, nurses, medical technicians, an orthopedic specialist, and a mental health specialist.[140] However, US medical assets came principally from USEUCOM. Originally the 67th Forward Surgical Team from Würzburg, Germany was tasked; however with its normal twenty-four hour window for deployment, it was unclear when they would be prepared to deploy. Consequently, the 52d USAF Mobile Field Surgical Team (MFST) from Bitburg/Spangdahlem, Germany and a Critical Care Air Transport Team (CCATT) from LRMC and Ramstein Air Base, Germany, were mobilized for movement. (A CCATT is typically a three-person team consisting of a critical care physician, an intensive care nurse, and a respiratory care technician; it is designed to augment a standard MEDEVAC crew). Although the decision to move the MFST and CCATT in lieu of the FST was made as the FST received its mobilization order, the FST was prepared to move from Ramstein Air Base at the time the MFST and CCATT deployed. The entire first MEDEVAC plane included seven air crew members, the MFST, the CCATT, a two-person Air Evaluation Liaison Team, one flight surgeon, one public health officer, one biotechnician, five medical technicians, fifty units of Type O blood, and assorted medical supplies. The MFST and CCATT arrived at approximately 0715 the following day, 8 August. By 9 August, two CCATTs, the 52d MFST, the 67th FST with twenty soldiers (and seventy-six units of blood, fifty from LRMC and twenty-six that had been purchased from the Germans), and the 254th Combat Stress Control (CSC) detachment with seven soldiers had arrived in Kenya. [141]

One issue of the response that significantly impacted the Embassy and DOD personnel was mortuary affairs. With no outside assistance, victim identification fell primarily on the Embassy staff. The familiarity with the victims placed additional burdens on them during this very stressful period. In addition, inadequate numbers of host-nation forensic personnel and refrigerators, and the overwhelmed coroner (one for the entire country) also delayed the clearance of bodies for release to families and their return to the United States.

The stress of the event, in addition to the losses the DOS personnel experienced, placed undue psychological strain on the entire Embassy "family". DOS medical personnel on scene requested urgent mental health assistance. The DOS had a psychiatrist in theater and he was dispatched immediately.[142]

At approximately midnight following the blast, a plane from South Africa arrived to begin the medical evacuation process for the injured. This asset, which had been orchestrated through the DOS

EOC, arrived with little warning and unbeknownst to the medical personnel at the scene. Medical personnel were informed that use of this asset was for US casualties only, i.e., no injured local nationals were permitted. DOD's medical evacuation planes and teams were expected shortly, so the medical personnel made the decision to not send critical US patients to South Africa, because patient tracking problems and eventual medical evacuation back to the US would be more difficult. In order, though, to prevent misuse and misinterpretation of the need for this plane, three non-critically injured patients with concussions were sent. [143] Movement of these and subsequent patents to the airfield was usually done on "vehicles of convenience" rather than formal ambulances which were virtually non-existent. The timing of patient movement and needs prior to evacuation were dictated entirely by the MEDEVAC personnel. The ever-changing plans caused additional delays and frustrations among the Kenyan ambulance service, which also was supporting the local national response effort. Additionally, much of the movement necessarily took place at night when road traffic was minimal.[144]

Medical personnel in Nairobi understood that DOD's medical evacuation teams would rapidly assess, stabilize, and return immediately to LRMC in Germany. To facilitate the process, USAMRU personnel prepared the necessary medical evacuation information and began to arrange for ambulance transfer from the hospitals to the airfield. The chaos that persisted in the city, the poor communications infrastructure, the lack of vehicles, and the geographic dispersion of casualties all made this process very difficult.

The initial CCATT that arrived 8 August was tasked to return critically injured patients back to LRMC. Upon arrival in Kenya, however, it presented the medical personnel on scene (now awake for almost twenty-four hours) with a variety of additional requirements, all of which further complicated the patients' movement. These problems included:

1. Only one flight crew deployed, thereby necessitating the entire flight and medical crew to take "crew rest" upon arrival. Evacuation personnel told Dr. McCoy that the return flight would not depart for at least fifteen hours. It finally departed more than forty hours following the blast.
2. The CCATT brought no medications for their own personnel, prompting the medical personnel on scene to return to the bombed-out medical clinic to search for necessary "sick-call" medications.
3. The crew had no food provisions for patients on board for the return flight and requested "Meals, Ready to Eat " (MREs).
4. The CCATT had minimal medications for the patients.
5. Stabilization for transport necessitated repeated studies (such at CT scans) before the CCAT would fly the patients; this use stressed the already limited resources in the city hospital.
6. The CCAT had no ground communications capability.
7. Transport ventilators were not voltage-compatible with local power.
8. The CCATT's interactions with host nation medical personnel resulted in numerous complaints by the senior hospital staff. For example, prior to the first sortie of patients, the MEDEVAC

crew did not permit the hospital nursing staff to provide transfer reports, the crew did not meet with the hospital's Chief Matron of Medical Director, and they did not acknowledge the efforts of the hospital, especially the extra burden placed on them because of the delayed medical evacuation. The subsequent evacuation, seventy hours after the bombing, went smoother once the JTF Senior Medical Officer and Commander met with the hospital staff.

9. Not only a lack of vehicles and ground communications, but also a lack of transport ventilators and supplies complicated movement to the airfield.
10. Because they flew on a C-9 Nightingale, palletized medical equipment could not move because of the aircraft's limited load capacity. [145,146,147]

Upon return to Ramstein Air Base on 9 August, the first sortie contained ten Americans and five Kenyans. On arrival, one Kenyan was immediately flown by helicopter to a German university hospital approximately 20 miles from LRMC, and the remainder were moved by ambulance to nearby LRMC. [148] By 14 August, USCENTCOM reported that the medical situation was stabilizing and that additional medical assets were not needed. On the ground at the time was the 67TH FST, the seven members from the 254th CSC, and ten Air Force medical personnel.[149] For the most part, all seriously injured Americans had been treated and released, or medically evacuated to Germany. The 67th FST assisted local national physicians in their backlog of casualty treatments, and the 254th CSC continued the ongoing mental health support of American and local national victims.

By the time operations on the ground had stabilized, approximately 250 medical and support staff and 288 units of blood had arrived. On these flights, as well, USAID provided the Kenya government $25,000 of medical supplies, four major surgical kits (capable of providing medical assistance to 40,000 people for three months), four minor surgical kits, and four emergency medical kits.[150] As often happens in disaster response efforts, large influx of personnel and equipment, much of it unneeded, placed additional problems of coordination and logistical overload on already overtaxed personnel and equipment at the scene.

REDEPLOYMENT

As discussed above, the nature of this event challenged the mental health and stability of the Embassy staff, family members, and local national employees. Mental health volunteers from the community provided services wherever they saw a need. The DOS Regional Psychiatrist, Dr. Jamie Svarez, who was based in Pretoria, South Africa, arrived within sixteen hours of the bombing, and coordinated the effort for the first week. Virtually all American and Kenyan Embassy Staff members attended formal debriefing sessions, which were accomplished in large part because of local mental health volunteers. Foreign Service nationals and Embassy family members attended sessions later. DOD's CSC assisted in these debriefings and counseling sessions. Parts of this team remained in place up to three weeks following the bombing.[151]

Eventually, all of the injured Americans and four Kenyans were further evacuated to Walter Reed Army Medical Center (WRAMC) in Washington, DC for final care. Problematic in the rehabilitation and follow-up of the Kenyan patients was their eventual return to Kenya. In order to assist in this process so consultants at LRMC and WRAMC could monitor their progress, DOS, with DOD's assistance, deployed a telemedicine platform to the Nairobi Embassy Health Unit. This platform, although designed for long-term follow-up of stable patients, may have proved useful during the crisis, particularly in helping to identify the survivors' needs.[152]

After action reports (AARs), part of normal redeployment processes, are virtually non-existent or, more likely, not readily available. It is assumed that each organization which participated in the response effort maintains its own review of the mission. Additionally, other issues of force protection, such as long-term follow-up of participants or victims for medical or mental illnesses do not exist.

FEDERAL GOVERNMENTS' RESPONSE TO THE IDENTIFIED PROBLEMS

DEPARTMENT OF STATE RESPONSE

The Accountability Review Board was the tool used by DOS to critically look at the Kenya and Tanzania Embassy bombings. Secretary of State Madeleine Albright convened the board on 5 October 1998 in accordance with the Diplomatic Security Act. Its goals were to "...review the circumstances of each of the bombings, to assess the adequacy of our security systems and procedures, and to recommend improvements to them."[153] Of the many recommendations of the Board, those discussed here apply only to medical issues in the response.

Many of the medical problems that arose in the Nairobi bombing related to larger, more strategic issues regarding the overseas presence of the DOS. Proposed changes may affect future medical planning and support. These include looking at how intelligence information is gleaned and distributed, features of building design and protection, and even the numbers of personnel stationed at each post. [154]

As noted, the EAP of the Nairobi embassy did not include the response to a car-bomb. Additionally, training for MCIs had never been conducted. Therefore, DOS plans to conduct drills at their embassies which will include all personnel and likely scenarios.[155] EAPS also will need to address nuclear, biological, and chemical weapons threats, for although this is a major topic for research and funding in the US, little preparation has been accomplished overseas. [156]

DOS has made a significant effort in developing a detailed Medical Emergency Action Plans for its posts. Initial efforts have been to standardize and accumulate information on natural and man-made disaster threats, such as risks from nuclear facilities, chemical manufacturing or depot, facilities, and terrorism. Local and host-nation resources are also being investigated, to include embassy medical personnel, local medical treatment facilities, police/fire/search and rescue capabilities, hazardous material handling capabilities, etc. Finally, local logistical information such as transportation assets, medical

supplies and storage, etc. is being collected.[157] The end-product, an Emergency Medical Capability Survey, will provide DOS personnel at foreign posts and in Washington, invaluable information for planning and response actions. The routine use and availability of accurate, up-to-date data, inside and outside of the DOS, will be a challenge.

Crisis management training identified in the ARB will also be addressed. Such training must reach across functional lines within the Department, "and across departmental and agency lines, to encompass the full range of problems and potential solutions that are raised by mass casualty incidents."[158] The training will include exercises as well as a syllabus for use by those who do not regularly participate on such task forces. Crisis Management Exercises are projected to take place at each post by the completion of FY 2000. This training will be invaluable, for the ARB noted that an evacuation or drawdown of Embassy personnel has occurred approximately every four weeks over a ten-year period since 1988.[159]

One major problem that occurred in the response to the disaster was the timely arrive of the FEST, due in large part to mechanical problems of an aging plane. DOS with the Office of Management and Budget are looking at new plane options. Conceptually, the FEST will now be broken into two teams, one with a departure time of four hours after notification, and the second in eighteen hours. For the first time, the FEST concept will also include personnel tasked to conduct an initial medical assessment. [160]

To address the medical shortcomings of the response and improve medical support processes, DOS and DOD's Joint Chiefs of Staff have created an Interagency Working Group (IWG). Members of this group include representatives from The Joint Staff – J4 Medical Readiness Division (MRD), DOS, DVA, DHHS/OEP, and the Uniformed Services University of the Health Sciences (USUHS). The goal of this IWG is to develop the mechanisms to "...mobilize immediately an emergency medical team on the ground to assess the needs of survivors and oversee their care. ...Readiness will be enhanced by analyzing in advance the types of disasters and responses, and defining circumstances in which a response may be automatically activated without awaiting a formal request or medical information from the scene of the disaster."[161] The IWG to date has primarily focused on establishing contacts and developing a familiarity with each of the members' resources and processes. Attempts to codify a modus operandi for the flow of information, requests for assets, and tasking for deployment continue to evolve yet remain uncompleted.[162] The IWG struggles with many of the challenges already discussed about disaster planning. These include trying to accomplish goals during other ongoing crises, having leadership from several agencies, and attempting to define and establish an end-product or goal. However, the processes of meeting and engaging decision-makers in other agencies is important and could potentially improve future cooperative responses.

The DOD, through USUHS in Bethesda, MD has developed an ongoing medical training program for DOS medical personnel. This program varies its content yearly to meet the needs of changing medical knowledge and operational topics unique to practicing medicine in austere and threatening foreign environment. For example in 1999, topics included: "Overview: Potential Threats; Types; Severity;

Sequela;" "Mass Casualties: Philosophy of Response: Preparation Assessment, Contingencies, Personnel, Supplies, Facilities – U.S. and Overseas;" " The Nairobi Embassy Bombing: The Medical;" a "Health Care Informatics Workshop;" and a series of lectures on the psychological and medical aspects of trauma. The 2000-year course focused more on gastrointestinal, cardiovascular, and infectious diseases as well as topics on pregnancy and psychiatry. Additionally, USUHS teaches training classes for DOS medical personnel in Advanced Cardiac and Trauma Life Support Courses.[163, 164]

As previously discussed, DOS with DOD has installed a telemedicine system for use in following cases of injured Kenyan employees in Nairobi. Additionally, the Department is creating a "database of local medical resources throughout the world [to] enable Department medical officials to contact and communicate directly with local and regional medical personnel, brief reserve support teams, coordinate with US medical personnel, and develop alternative medical support options on short notice."[165] Such information would be invaluable should the medical officer be unavailable or incapacitated. Many of these initiatives are needed and could be beneficial, but are also dependent upon reliable information technology. DOS unfortunately lags far behind in this area, for "...many U.S. employees overseas cannot even send e-mail to colleagues across the hall...."[166]

DEPARTMENT OF DEFENSE RESPONSE

Attempts by the author to obtain AAR's of the Kenya Embassy Bombing from USCENTCOM and USEUCOM Surgeon's offices and other USEUCUM units who participated in DOD's response, were not successful, due in part to their classification as well as the operations tempo of their offices. However, invaluable information from the USEUCOM Surgeon's office did provide insight into some of DOD's response (specifically USEUCOM) to the difficulties of the medical response to the Embassy Bombings.[167]

No specific disaster plans exist to respond to an event such as an Embassy bombing. With the need to support and potentially evacuate US citizens, Non-Combatant Evacuation Operations (NEOs) become the model used by most planners. Preparation for events such as a terrorist bombing, though, remains part of USEUCOM's mission. For example, evaluation of host nation medical facilities is accomplished as part of pre-disaster planning through a Survey and Assistance Teams and routine peacetime engagement activities. Medical personnel assigned to these teams and involved in other engagement activities assist in evaluating host nation medical facilities and developing locations and procedures for air operations. Information on host-nation medical capabilities is then routinely forwarded to the Armed Forces Medical Intelligence Center for inclusion in their databases. Assessment of a disaster that has occurred comes through any available means, including the media and direct contact with the embassy.

Most of the developments and lessons-learned from Nairobi have been applied to response efforts. Currently USEUCOM has available, on a military service-rotating basis, Medical Crisis Response Teams (MEDCRTs), capable of deploying within eight-to-twelve hours (prior to the Embassy bombings the

deployment window was twenty-four hours). These surgically-heavy teams contain approximately twenty-five personnel and have the following minimum capabilities: life-saving surgical intervention for twenty patients in a forty-eight hour period, no medical or life-sustaining re-supply for twenty four hours, deployment of all personnel and gear on one C-130 sortie, and preparation to provide force protection, logistics support, command and control, and communications support if needed. The concept of a "Mini-MEDCRT" (analogous to an MFST) capable of deploying on a C-21 or C-12 is being developed by USAF Europe.[168] Additionally, USEUCOM is looking at changing the composition of the force package. If the types of initial injuries that remain once a surgically-based team arrives require more stabilization, medical care, or preventive medicine than surgical care, than a force package matching these needs should be quickly deployed.[169]

DOD also has worked to improve its communication with other agencies, specifically through the Medical IWG discussed above. A Transportation IWG has also been developed to look closely at the transportation requirements for a disaster-response effort.

OTHER FEDERAL AGENCIES' RESPONSE

In September 1998, a five-person medical team, led by The US Surgeon General, Dr. David Satcher, was sent to Kenya and Tanzania by President Bill Clinton to foster a US-African partnership in the field of emergency medical response systems. The team noted that although the victims "were well cared for" once they were at the hospitals, there would have been fewer dead if "...there had been a different level of emergency response available in Nairobi...."[170] As part of the intent of this trip to foster the development of an improved emergency medical response capability in Africa, the Surgeon General told guests at a luncheon held in his honor that ..."I am prepared to say today that the Department of Health and Human Services has already committed to providing personnel, equipment, supplies, and training opportunities so that over the next months...we can put in place an exemplary emergency medical management system to deal with disasters."[171]

The Surgeon General's comments validated the already evolving concept in DHHS's Office of Emergency Preparedness of using a specially-trained DMAT for overseas use. Depending on the scenario, this team could function as a replacement for, or complement of DOD medical assets in providing urgent medical support to US nationals injured in an overseas disaster such as a terrorist bombing.

Currently, OEP has formed a single International Medical Surgical Response Team (IMSuRT) based around the DMAT at Massachusetts General Hospital in Boston, MA. As part of the NDMS, the IMSuRT's mission is foremost to respond to a DOS request for assistance in managing American casualties of a terrorist attack. Specifically it is designed to perform stabilizing surgery or other procedures and to prepare patients for medical evacuation by DOD aircraft; secondarily it has a humanitarian mission in treating host nation casualties. Currently the concept of operations is for a nineteen-member advance team to move rapidly, perhaps in concert with or shortly after the FEST, to an intermediate staging base,

or directly to the disaster site. This advance party of mostly physicians and surgical support personnel would travel with minimal equipment and rely heavily upon local infrastructure for logistical support. Within approximately twenty-four hours, the remainder of the thirty-one person main body would deploy with self-sustaining equipment such as a tent and vehicle. The team should be self-sufficient for seventy-two hours and be capable of remaining in place for ten to fourteen days.[172]

RECOMMENDATIONS

PLANNING

CHALLENGES

All MCIs become a communications and assessment nightmare. Communications plans must reasonably ensure such capability persists. Packages, such as reliable telemedicine equipment, could help in patient management and assist crisis managers in the various EOCs obtain damage assessment. Such equipment and other disaster supplies need to be stored in an off-site location to ensure their survivability in the event of a disaster.

Victim accountability similarly complicates rescue efforts. Overseas posts and installations need to have sufficient personnel and medical records, in a secure environment, that permits rapid easy accountability of unit personnel. These records also ease notification of next of kin in the event of personnel deaths. [173]

Potentially, the numbers of personnel stationed at overseas posts will diminish, partly due to increasing technological capabilities.[174] This will clearly impact how those personnel are medically supported. Possibilities for care include increased reliance on host nation support, though in many areas this will be substandard. Virtual medical support with telemedicine can extend the capabilities of many health-care providers through the "on-scene" support of experts by their virtual presence. However, US military medical protocols dictate that if an individual becomes too ill and needs to be medically evacuated, then DOD responds with a MEDEVAC aircraft. With advanced technologies, it is feasible to evacuate patients on an aircraft of convenience (such as a commercial flight already in the area) with adequate support and monitoring equipment and a health-care provider.

Critical to the challenges facing the plans for an overseas disaster is the mere time-distance factor. Most posts sit in remote locations often with minimal host-nation infrastructure and assets to support a disaster. CONUS disaster plans usually rely on local assets for approximately twenty-four hours of support until a federal response can be mobilized. This window of self-sustainment may need to be expanded for certain remote sites.

Training in the crisis management of mass casualty and mass destruction incidents needs to occur for potential crisis managers in the DOS EOC. This training also needs to occur on site at overseas

embassies and posts. [175] As noted, interagency training and validation of training exercises needs to take place on a recurring basis to ensure adequate preparation.

Medical personnel must get into the decision cycle of the intelligence, plans, and operations sections of their organizations. Failure to do so places medical planners and medical responders into a reactionary stance. For example, intelligence issues regarding potential threats (e.g. weapon types, timeliness, and location) play a major role in defining medical preparedness and response requirements. Sharing of such information will not come easily, because medical personnel and planners do not typically engage intelligence, plans, or operations personnel. Once the interaction has been made and medical information and planning validated, an open sharing of critical information will occur. The end result should improve medical support and save lives.

Key to planning for a disaster is to "develop strategies to overcome resistance to preparedness."[176] Planning for important, but low-probability events, competes with day-to-day activities that tend to take higher precedence. Planning for what is most likely, based upon current threat analyses (which again requires medical personnel to be in the intelligence dissemination loop), will enhance preparedness. Additionally, fostering personal relationships between the operators of the likely agencies enhances readiness. These factors, linked to recurring and realistic training, will lead to an effective disaster response.

Disaster planning can appear overwhelming to those tasked to write or exercise a plan. However, to simplify the process, high-probability, recurring events are predictable and should be incorporated into every plan. Common problems that should be planned for include: evacuation to safety, search and rescue efforts, interagency operations, communications problems, damaged response facilities, casualty management and tracking, mortuary affairs, mental health support, dealing with volunteers, and media operations.[177]

INTERAGENCY/INTERSERVICE INTERRACTION

Policies regarding interagency, intragovernmental support for DOD are outlined in DOD Instruction 4000.19. In CONUS, this document designates Joint Interservice Regional Support Groups (JIRSG's), based upon geographical regions, to facilitate coordination and communication between DOD and other federal agencies (However, this document does not firmly establish such support. For example in JIRSG Region 4, encompassing Rhode Island, Eastern Connecticut, and Southeaster Massachusetts, the DOD Executive Agent remains "to be determined").[178] This document establishes the conditions for agreements between agencies, particularly in reference to reimbursement. Additionally, "Memorandum of Understanding" and "Memorandum of Agreement" define the relationships between two cooperating agencies. Such agreements formalize cooperative actions and define what contribution each party makes. Without such agreements, informal arrangements will fail in times of crises or when the individuals making the arrangements change.

In CONUS, DOD coordination with other federal agencies, state and local governments, and civilian organizations is becoming more commonplace. Developing a working command and control relationship with them is critical to efficiently use DOD assets without subjugating (or giving the impression of doing so) other organizations. The Center for Army Lessons Learned (CALL) serves as a repository for tracking Army after-action reports and other information that is useful for planning purposes, in an attempt to obviate the repetition of past problems. From CALL's Newsletter 93-6, review of joint command and control issues in disaster assistance provided the following lessons:

1. All publications regarding disaster assistance need review and updated of chains of command, operations, procedures, and personnel issues for different emergencies,
2. Specify units to deploy to conduct disaster assessment,
3. Consider jurisdictional boundaries before tasking unit areas of responsibility,
4. Clearly define the requirements for completion of disaster assistance missions, and
5. Prior to, or early in an emergency, conduct an intelligence preparation of the battlefield (IPB).[179]

To aid in this process, each Army Installation or CINC has a Defense Coordinating Officer (DCO) with a Defense Coordinating Element (DCE) to coordinate these activities with local agencies. Although domestically focused, such an organizational element would have clear benefits overseas, particularly in the medical support arena. A designated "Medical DCO" in the CINC Surgeon's office with specific links to specific DOS posts or assets would clearly facilitate efficient coordination in times of emergencies.

Joint Pub 3-08 outlines the doctrine guiding interagency operations. Prior interaction between the Ambassador's staff and the CINC's staff facilitates any crisis response. However, conspicuously absent in this manual is the delineation of medical support operations. The doctrine tailors its medical aspect only to Humanitarian Assistance Operations; even determining medical needs centers on the deployment of a Humanitarian Assistance Survey Team (HAST).[180] Sudden impact disasters with an MCI will not easily dovetail into this model.

Medical personnel are often accused of "stovepiping" their information, yet direct flow of data from medical personnel on the ground to the CINC Surgeon's office and the DOS EOC must occur unfiltered through other DOD or DOS personnel. Complicating this assessment information (as happened in Nairobi), is the command relationships of the CINCs. The medical personnel at the tip of the spear not only had to communicate with their leaders in the DOS, but also with both the supported and supporting CINC Surgeons. Predisaster medical communications drills could avoid such issues. The medical personnel on scene, in addition to feeding information higher, are actively engaged in medical treatment and triage. Once their assessment and perceived needs have been communicated, the subsequent information flow to identify assets and deploy them should require little or no communication with them. Establishing an interagency planning cell in a CINC headquarters and/or a specific DOD medical liaison from JCS or the CINC in the DOS EOC after a disaster would facilitate communications and coordination of the medical response effort.

DOS plans currently being developed have expanded the Medical Emergency Action Plan and included detailed guidelines for both the individual post and DOS Medical Services in Washington, DC.[181] Additional beneficial information should be a focus on inter-agency cooperation. All posts, or at a minimum those deemed at greatest risk, need to be in contact with the supporting CINC Surgeon in order to foster an open line of communication. Such communication currently occurs between the Defense Attaché and regional CINC. However, medical contact is not done routinely except through medical exercises or other DOD activities in the host country. Follow-on sharing of medical plans, training opportunities, medical exercises, etc. could only solidify such a working relationship needed in times of emergency. Such a "team-building" initiative should also occur from the CINC Surgeon as described above with the Medical DCO concept.

Additionally, both DOS and the CINC Surgeon's office should be familiar with other friendly nation medical assets that could be used in times of need. Although local assets may not meet the necessary standards, other medical facilities in the region could prove invaluable in saving American lives. The US cannot afford to view its response with solely its own assets as the only viable option. A prime example was the use of the United Kingdom's Royal Air Force Hospital in Crete that was used in support of the Beirut bombing.

FEMA is in the disaster business. Intuitively this organization should be able to provide invaluable assistance to the DOS, DOD, or other agencies that respond to overseas disasters. Specifically they have "...extensive experience, and expertise in providing training in management, first response, prevention and assessment of natural and non-terrorist disasters – which will continue to be a bigger risk at posts than terrorism." [182] DOD needs to ensure disaster planners, including medical planners and those stationed overseas, are familiar with FEMA products and methodologies.

As inter-agency operations become more commonplace, training must occur not only to breech many of the cultural barriers between governmental agencies, but also to improve the outcome of the mission. These cultural biases exist not only between Federal Agencies, but remain a part of inter-service parochialism within DOD, in spite of the "jointness" goals of the 1986 Goldwater-Nichols DOD Reorganization Act. [183] Non-DOD Federal Agencies also have their own impressions of DOD and the military culture. In that regard, USAID, for example, has published guidelines to enlighten personnel and agencies on military culture. For example, the main characteristics described of the military include a highly structured chain of command, an authoritarian, goal-directed approach to mission accomplishment, a work ethic of "work hard, play hard", a respect for physical prowess, and an inherent training in operational security.[184] Military leaders are said to be "assertive, decisive, and tenacious" and will run highly structured meetings. [185]

When faced with an embassy bombing-like event, interservice and interagency biases will naturally be present at all levels. Unfortunately, the decision-makers in operations such as a disaster response receive information provided by individuals and organizations with entrenched prejudices.[186] These inherent conflicts now appear in homeland defense issues, particularly in the area of weapons of mass

destruction. Out of necessity, DOD personnel must now interact and train with many different Federal Agencies, many of which they have never worked with before. Repeated training and exercises may break down some barriers. However, for example in US Joint Forces Command, such training receives the lowest of all categories of training, even below that of multinational training.[187] Clearly, in order to effectively meet the needs and expectations of injured American citizens, such training and cooperation must assume a higher precedence.

When disasters occur overseas, the distinction between a natural event and an attack becomes important in determining which Department assumes the leadership role. A deliberate attack on US citizens or property may result in the CINC for that region assuming control of the operations, whereas in a natural disaster, the Ambassador normally takes charge of the US disaster response. When the events are unclear, the National Security Council determines the command and responsibility relationships.

Decision-making in multi-agency operations unfortunately often results in tensions and posturing. As previously discussed, the DOS, and specifically the Ambassador, normally has the overall authority in overseeing a terrorist bombing in a host nation. Yet how the decisions are made, and by whom, ultimately reflect on relationships between the military and civilians or non-DOD Federal employees. Those relations have been described as having three distinct, albeit controversial, components which may play a role in defining how the agencies cooperate. First, military decision makers, may, in fact be better prepared to execute future decisions than their non-military counterparts, for they typically are better educated, better trained, and generally have had more experience. Secondly, military and civilian leaders often differ on their view of the desired future or end-state. Finally, what constitutes a "normal" or correct working relationship between military and civilians is changing.[188] The cultural differences between agencies and between services within DOD must be addressed and cannot be trivialized. Only through recurring interaction and training will those barriers begin to come down.

DESIGNATING UNITS

Units or teams that are designated to respond to disasters should be composed of motivated, enthusiastic, physically and mentally fit members who understand the confusion and frustrations of operating in a disaster environment. Ensuring team members understand the potential missions, their dangers, and the potential impact on their normal occupation must be fully understood by all.

Little information exists on the selection process of team members. Typically, the focus of selection are the attributes listed, often minimizing their mental health or ability to cope with the potential environmental disasters to which they may be exposed. Many team members have prior military service or have deployed with a variety of non-governmental organizations. Yet many may not meet the physical and mental requirements needed to participate in such missions.

No standard approach to selection, training, and managing field workers, however, exists among agencies involved in humanitarian actions. The top criteria of twelve humanitarian relief organizations that may have potential usefulness to disaster assistance teams are a relevant postgraduate degree, a sense

of humor, and the ability to admit weaknesses and share emotions. Other important characteristics noted included foreign language skills, cooperativeness, good communication skills, leadership capabilities, ability to remain calm under stressful situations, sensitivity to the culture, and maturity.[189]

In order to properly select volunteers for these organizations, and to ensure their well-being, organizations involved in disaster relief should evaluate their personnel management. Standards for selection should be established and methods to monitor their physical preparedness as well as their mental health and stability should be devised. Team members should play an active role in developing team training methods, including the recognition and management of stress-related problems. Finally, team members need to undergo debriefings and other re-deployment evaluations to ensure the tracking of potential long-term medical and psychological problems.[190]

Team member selection, whether DOD or non-DOD (civilian) must also consider their normal daily jobs. DOD team members, although able to be tasked to move rapidly, still may have factors complicating their deployment. If assigned to one unit such as a hospital, but attached to a contingency response team, their commander will necessarily want to ensure the individual is formally tasked before releasing them to the response team. This engagement in normal, daily activities will be further complicated with civilian volunteers who may have clinics, procedures, or family activities scheduled that conflict with immediate deployment. Although not insurmountable, this issue must be considered in selecting team members and tasking teams; failure to do so will delay any urgent disaster response.

CINC SURGEON

At DOS request, DOD responds to an overseas disaster primarily through the regional Unified Commander (CINC) whose Area of Responsibility covers the affected disaster location. Coordinated between the CINC Surgeon's Office and the Joint Staff, regional and other DOD medical assets mobilize to support the relief effort. Time constraints define the assets that need to be mobilized. As discussed in the section on historical data from bombings, any victim with life-threatening injuries that is not evaluated and treated within the first twelve to twenty-four hours is unlikely to survive. The standard approach used in Humanitarian Assistance missions where the CINC initially deploys a Humanitarian Assistance Survey Team (HAST) within twelve hours and then mobilizes a Joint Task Force (JTF) within forty eight to seventy two hours, will not save American lives. Mobilization of predictably-needed resources, based upon assessment gleaned from the historical data, disaster modeling, media coverage of the event, and other on-site assessment tools must occur. Some view movement of support units without adequate assessment of need as launching on "suspicion." Ill-suited units or repetitively mobilizing volunteers away from their normal jobs, only to cancel missions, will degrade unit cohesiveness and support. However, predictable response criteria need to be developed to allow rapid deployment of assets in order to save lives.

Without proper coordination of effort, medical planners in a CINC Surgeon office could easily duplicate, or even conflict with medical planners at DOS. Communication must occur between these

parties and with other medical agencies such as DHHS. Placing a representative from JCS-J4MRD in the DOS EOC as previously mentioned, and perhaps from DHHS' OEP as well, would clearly enhance the unity of effort in planning the medical response. Representatives from the appropriate CINC Surgeon office, either in person or virtually, would similarly help coordinate the effort.

Full knowledge of all available medical resources within each CINC will be critical to forming a medical response. In addition to the MEDCRTs in EUCOM, each Army Regional Medical Center has developed Special Medical Augmentation Response Teams (SMART). Currently there are thirty-seven teams available, including Trauma-Critical Care Teams (SMART-TCC), Chemical-Biological Teams (SMART-CB), Stress Management Teams (SMART-SM), Medical Command, Control, Communications, and Telemedicine Teams (SMART-MC3T), Preventive Medicine/Disease Surveillance Teams (SMART-PM), Burn Teams (SMART-B), Veterinary Teams (SMART-V) and Health Systems Assessment and Assistance Teams (SMART-HS). Each Regional Medical Center has a core of SMART Teams TCC, CB, SM, and MC3T. In a disaster response, the SMART-TCC is tasked to be available to deploy within twelve hours, and provide medical augmentation and support to local medical authorities. Also, the Air Force has developed Mobile Field Surgical Teams (MFST), as deployed to Nairobi, to move rapidly for emergencies. Each MFST is composed of a general surgeon, an orthopedic surgeon, an emergency physician, and anesthesiologist or anesthetist, and an operating room technician. They travel lightly (350 pounds in five backpacks, a sixty pound generator, two litters, and 200 pounds of personal gear) and are designed to provide advanced trauma resuscitation for up to twenty patients, performing ten life or limb saving procedures. [191] Tracking these many assets will be problematic, for their availability is often command-dependent.

OTHER CIVILIAN OPTIONS

As discussed, DOD, particularly in USEUCOM, has response teams with surgical and trauma capability available on short notice for mobilization. These resources, in concert with other teams with differing functions (e.g. medical evacuation using the CCATT) should be able to head toward the disaster site within twelve to twenty-four hours, depending upon the availability of transportation assets.

Alternative support options need to be further explored. Based upon its role as the Lead Agent for ESF#8 in the FRP, the Office of Emergency Preparedness in DHHS, has developed such an alternative in the IMSUrT described previously. This team, properly trained and staffed, should be able to begin movement to a disaster site within several hours, given the transportation constraints described for DOD units.

Other civilian-based teams have been developed in the past and could likely mobilize again if needed for specific missions. For example, in 1990, the Society of Critical Care Medicine created a voluntary corps of 757 multi-disciplinary intensive care specialists. On 10 January 1990, DOD requested that they be prepared to provide support, primarily to overseas military treatment facilities. These

volunteers were task-organized into thirty, multi-disciplinary teams and were credentialed as American Red Cross Volunteers. [192]

Moving civilian organizations into a joint operation involving many federal agencies requires close monitoring and much preparation prior to movement. In November 1995, the 67th Combat Support Hospital (CSH) from Würzburg, Germany began its final preparations for movement into Hungary to support US Forces moving into and out of Bosnia-Hezegovina for Operation Joint Endeavor. Several of the lessons learned from their employment, common to most deploying military medical organizations, must be considered.

Prior to deployment, all organizations trained extensively for the mission. This training entailed both individual and unit skills necessary for the mission. Important in the training cycle for the 67th CSH was its final validation exercise in Grafenwoëhr, Germany. Most leaders want to ensure that the people or organizations who work for them are competent and will help the mission, rather than being a burden. In addition to the training requirements outlined below, validation of that training must occur.

Transportation and movement in disasters rarely occurs without complication. For example, in 1995 the 67th CSH knew they were to deploy, but they did not know whether they would leave before or after the Thanksgiving and Christmas holidays. This clearly placed additional stress on the unit's leadership, its members, and their families.[193] Deploying units must be aware of these factors and prepare their organizations for such confusion. Regular and frequent information updates must be planned, at all phases of the operation. Civilian organizations must prepare for getting information back to family members and should consider the formation of family support groups as most military organizations do. Additionally, developing a plan for managing the severe injury or death of a member must be addressed.

Once deployed, space/location ownership, ground movement, media operations, and interface with USAF MEDEVAC operations challenged the 67th CSH and would similarly occur with a civilian unit. Finally, as in all missions, the operation changed from planning to inception. "Mission creep" developed when the 67th CSH was eventually tasked to provide CSH resources outside the CSH walls.[194] All deploying organizations who respond to a sudden disaster may find themselves doing humanitarian missions, mortuary or veterinary services, preventive medicine functions, etc.

Other, civilian-based transportation, using pre-arranged agreements, may be the most reliable means of getting medical assets to the site rapidly. The disaster location, the other assets deploying, and operational constraints such as a non-permissive environment, will determine which assets are tasked. This designation must occur with the knowledge and oversight of the lead agencies at the Emergency Operations Center in the DOS in Washington, DC.

OVERSEAS RESPONSE USING OTHER MODELS FOR DISASTER SUPPORT

All likely requirements should be addressed in planning for an overseas disaster. As discussed previously, although the timing of sudden-impact disasters may not be known, their impact can be predicted and modeled. FEMA approaches all CONUS-based disasters using the FRP, thereby ensuring

all aspects of a disaster response are addressed by "subject matter experts," i.e. the lead agencies in each ESF. For medical support plans, Army medical planners use the guidelines found in FM 8-55 to ensure they address all possible medical support needs in each of twelve functional areas.[195] Similarly, the American Red Cross divides Disaster Response Functions into four areas of Management, Direct Services, Internal Support Services, and External Support Services, each with detailed functional components to organize its disaster response effort.[196]

At the heart of the issue regarding the planning for the DOD's role in an overseas disaster may lie its inflexible joint organization. Standard command structure for joint operations includes the commander and staff, and normally J-1:personnel, J-2:intelligence, J-3:operations, J-4:logistics, J-5: plans, and J-6:communications and electronics. This organizational schema may not hold true for combined or coalition operations and may similarly not apply to interagency operations that cross jurisdictional lines of governmental and private organizations. It does efficiently coordinate service roles, but "...it ends there, leaving commanders to build relationships and communications with other actors on a piecemeal basis."[197] As discussed before, the standard model used throughout the United States in disaster response, is the Incident Command System. ICS has been used in many disasters, designed to provide a tailored, modular, and flexible response to the disaster.

Under ICS, consensus building of purpose and direction occurs under the Unified Command, a concept not often found in military command structure. ICS deliberately mixes the parties who form the command structure, thereby ensuring cooperation. In a non-military environment, the U.S. Coast Guard has adopted the ICS as its standard response system with training and qualification outlined in USCG Command Instruction 16471.2.[198] DOD units and organizations that might become involved in such organizations should become familiar with and train using the ICS. This training needs to occur not just within unit command, but also should be taught and exercised at the DOD's military schools.

Important in managing a disaster with an MCI is that a physician or other health-professional with disaster medicine experience serve in the command structure. Responses can hopefully be tailored to proven or predicted need. One model for integrating medical officers into the disaster response decision-making is the "Rescue System" used in Paris. In response to the recent history of terrorist bombings, the city-wide response was broken into a "red plan", focusing on rescue operations and treatment on site, and a "white plan" that looked at medical evacuation and hospitalization of victims. Separating these two functions into modules ensures continuity of effort and provides flexibility in the medical response.[199]

UNIT TRAINING

Unit preparation for response to an overseas bombing disaster currently remains without standard. DOD assets that deploy meet specific service and unit requirements and mission standards. However, guidelines regarding interactions with host nations, other federal agencies, etc. are not formalized, though some attempts to correct this have been made. For example, all USEUCOM FSTs

rotate through ongoing Medical Exercises in Central and Eastern Europe (MEDCEURS).[200] DHHS/NDMS encourages local, independent training for its DMATs, but has no formal minimum training standards. In contrast to designated training funds in DOD units, DMATs rely primarily on funding by their sponsoring organization for training. Additionally, training requires coordination with the day-to-day activities and jobs of the civilian volunteers who comprise these teams. Unit training standards for these teams are being developed to determine unit readiness levels. [201] These standards will clearly need to be expanded to meet the challenges of deploying to an overseas environment.

One training tool that should be explored includes DOD's Reserve and Guard units. Typically these units serve in geographic proximity to DMATs and other civilian organizations, providing a readily available resource for interaction with DOD units. Many exercises currently take place using these units and civilian organizations to focus on the domestic response to a weapon of mass destruction. However, similar exercises can model rapid movement of civilian or Reserve/Guard units to an overseas disaster. DOD's training expertise and facilities may prove to be valuable, cost-effective training instruments for both civilian and Reserve/Guard units.

Coincident with unit training that ensures the teams and units that respond to a disaster meet the same designated standards, these units must also interact in realistic training. Data supports that regular disaster drills improve the response to a real event. In order to be successful, the event simulations must also exercise not just the individual units, but also the multi-organizational, multidisciplinary, and multi-jurisdictional responses.[202]

INDIVIDUAL TRAINING

DOS has developed plans to institute first responder training for all embassy staff and to extend the treatment capabilities of the assigned medical personnel. Their training will include, as appropriate for the provider, first aid training, Basic Life Support Course (BCLS), Advanced Cardiac-Life Support Course (ACLS), Advanced Trauma Life Support Course (ATLS), and FEMA's Community Emergency Response Training (CERT). Other education has included the USUHS-sponsored courses discussed before. Other training that would prove beneficial includes the Army's Combat LifeSaver Training which would extend the capabilities of post lay-persons beyond basic first aid, and, for physicians, the Combat Casualty Care Course (C4) which would not only expose non-DOD physicians to DOD methodologies, but also develop their capabilities of practicing medicine under austere conditions.

Operating in a disaster environment is distinctly different from working in a clinical situation for most clinicians. However, disaster-relief team members often undergo no special individual training in disaster medicine or humanitarian operations. In addition, functioning in an overseas environment without being culturally aware of the setting can have disastrous consequences, as seen in the interaction that took place between the initial CCATT and the medical staff of the Nairobi Hospital.

In addition to specific trauma and resuscitation training, team members should undergo specific disaster- or humanitarian-assistance-related education, as many disaster-response teams may be asked

to respond to an HA mission as well. The curriculum for such education should include emergency disaster assessment, public health issues, governmental and non-governmental resources (including the United Nations and international health systems), tropical medicine, health needs of refugees or displaced persons, and international humanitarian legal issues.[203] The Department of Pediatrics at USUHS has developed a HA course that covers many of these topics. Medical planners, in addition to clinicians, must also be familiar with the unique aspects of disaster medicine and HA missions in order to properly support operations with these mission profiles.

Individual education on the treatment of MCIs in disasters should, however, begin even earlier in a clinician's training. Medical students at USUHS receive training and testing in MCIs when they deploy to a week-long field-training exercise during the fourth year of medical school. For many students, this is the only such training they receive until they deploy with a unit tasked to support such a mission. Sweden also provides similar training to their fourth-year medical students. Their system is more formalized, including twenty hours of theory on disaster medicine, followed by twenty hours of practical field experience, including liaison with other health-care professionals who may respond.[204] These training opportunities should be expanded, or opened to other venues for all members of disaster-response teams.

MILITARY CIVICS ACTION MODEL

Military Civic Actions (MCA) are " the use of *preponderantly indigenous* military forces on projects useful to the local populations at all levels, in such fields as education, training, public works, agriculture, transportation, communications, health, sanitation, and others contributing to economic development which would also serve to improve the standing of the military forces with this population."[205] The classic medical MCA is a "MEDFLAG" in USEUCOM where US military medical forces deploy to Africa for training with HN military medical forces in the response to a plane accident, volcano, mine explosion, etc.

Although not MCA's, the response to an OVERSEAS disaster requires adherence to several MCA tenets in order to be successful. Interpreters and translators will normally be required when interacting with local medical personnel. Additionally, US medical personnel must be knowledgeable about indigenous customs and traditions. Established lines of communication, such as those already established between DOS and HN personnel, must be respected and used. Finally, US medical personnel, must ensure that the HN medical personnel receive appropriate praise and thanks for their support of the US Government and its people.[206]

MODULAR CONCEPT

As already mentioned, disaster response is often based as much on emotion as need, typically responding with a large volume of resources that exceed the needs and capabilities of the people on location. Therefore tailoring the logistics response to the disaster is ideal. A certain standard, multi-

functional package of personnel and equipment, based upon historical precedence, disaster modeling, and disaster dynamics should respond on short notice. However, once the nature of the disaster is delineated, the response effort should be modularized to meet the specific and unique needs of each disaster. Mixing resources to cover all needs may include commercial air moving DHHS/OEP's IMSUrT and DOD aircraft moving a Combat Stress Control team and CCATT. Additionally, specialty team for pediatrics, burns, etc. could be subsequently added to the response mix.

The teams that deploy should be able to meet a standard set of functions. Clearly the team that deploys must be adaptable to the overall working environment and be able to perform its mission given the environmental, physical, and cultural constraints of the mission. It should be tailored to the type of disaster and understand how it fits into the medical infrastructure of the response effort and the remaining host nations medical facilities. Support functions, including transportation, communications, logistics, engineering, etc. must also be planned into each unit's mission. Deploying without this infrastructure places additional burdens on the overall relief effort. Where those units fit into the command structure of the response should also be planned and delineated prior to movement.[207] Finally, since the media will be present, the medical link for media or public affairs operations must also be included in the support package.

DISASTER MODELING

In addition to using historical data, disaster modeling previously described can also be a useful tool in predicting casualties. Invaluable information can be gleaned from such modeling technology. Focusing on Federal buildings around the world which are at greatest risk, medical support for them can be further refined. Possible answers include determining the best locations for medical facilities, storage needs for medical supplies, and types of supplies needed (based upon medical personnel available, host-nation capabilities, distance from relief support or medical evacuation, distance to friendly-nation facilities, etc.). Also, as building and security changes are made, such factors can be considered in the changing disaster model.

This modeling can also greatly facilitate the response effort. For instance, if the building's data has already been templated, reports of a blast can quickly be modeled to predict casualty types and numbers. Experienced engineers and programmers could look at a digital image of the disaster and give even more accurate estimates. [208] Such estimates, even if off by 25% as discussed, may be the only tool in times of limited medical assessment from the scene. Predetermined resources that would be needed to treat or manage these casualties could then be matched to available resources, better tailoring the response. Alternatively, considering the time and distances required to get resources to the scene, alternative treatment locations could be sought, or the effort could change its focus from rushing treatment teams to the scene to concentrating on medical evacuation.

PLANNING APPROACH – PULLING IT ALL TOGETHER

Disaster planning to respond to an overseas terrorist bombing disaster looks at the strategic processes involved in mounting an effective response. This planning differs from disaster management that focuses on the tactical response to a disaster. The ideal strategic preparedness plan will follow ten guidelines:

1. Look at the disaster both quantitatively and qualitatively, which is different from standard, common emergencies.
2. Strive for a continually revising plan, rather than a written product for the bookshelf.
3. Look at many general threats rather than focusing on a single specific threat.
4. Focus on the coordination of efforts rather than on a strict command and control relationship.
5. Look at general guidelines rather than specific details (keep the plan simple).
6. Assume victims will react well and be helpful during the crisis.
7. Integrate the processes between all affected organizations.
8. Anticipate common problems and develop appropriate actions.
9. Plan around valid disaster data rather than personal experiences of responders.
10. Address all phases of disaster response (prevention, preparation, response, and recovery).[209]

PLANNING EVALUATION

Many organizations look to develop generic plans in order to meet their disaster planning requirements. Such "planning by template" overlooks the unique characteristics of organizations and their disaster response capabilities. Additionally it obviates the more important aspect of disaster planning, that is the process itself. The American College of Emergency Physicians has developed a "Community Medical Disaster Planning and Evaluation Guide" to aid in determining the effectiveness of an organizational plan. Important factors include:

1. Legitimacy: Users must feel part of a legitimate plan, which is most likely to occur when they participate in the planning process.
2. Knowledge: All players in the plan must be fully aware of their role, and the role of their organization in the response effort.
3. Familiarity: Coordination between the many organizations that respond to a disaster occurs with intimate familiarity of all with the plan. Joint planning, training, and exercising fosters this coordination and awareness of the players.
4. Local Variation: Plans vary between organizations and levels. Non-DOD agencies typically look for one pattern of response from DOD assets. Certain policies and procedures are standard, yet individual variation will occur depending upon commanders (e.g. Unified Command CINCs) and their vision of response.[210]

ASSESSMENT

Disaster assessment produces operational decisions regarding resource allocation. Inaccurate assessment, or a harried assessment with exaggerated reports stating "It's a big one, send everything you've got," yield an inefficient and oftentimes inflated response.[211] Units then deploy based more on emotion than valid requirements. Because this phase of disaster management has not received the attention that response efforts have, relief efforts are often inappropriate, delayed, or ineffective. Increased victim morbidity and mortality result. "Improvements in disaster assessment remain the most pressing need in the field of disaster medicine."[212]

Many government and volunteer agencies have spent large amounts of resources without looking closely at how those organizations will be asked to deploy. Misuse and lack of a coordinated disaster assessment leads to a cycle of inappropriate and often, futile disaster response.[213] The ARB also noted the need for accurate assessment, stating that the FEST needs to include personnel trained in assessing the medical needs of MCIs.[214]

Many tools exist to assess disasters, yet most look at humanitarian assistance operations or complex emergencies. Although USAID, for example, looks primarily at these types of emergencies, the tools they use can be beneficial. USAID/OFDA's Field Operations Guide provides details on assessment teams, elements of assessments, report formats, and practical checklists.[215] Similarly, the World Health Organization provides guidelines for the rapid assessment of sudden-impact natural disasters, which can be invaluable. Although it also looks at a broader, community aspect of the disaster, it can serve as another tool to develop an appropriate assessment device for a bombing disaster.[216]

Whatever tool is chosen or developed, the assessment must focus on two variables: assessment of the disaster and its effects on persons and property, followed by a needs assessment. The format is less critical than the content. Information typically needed in an emergency health assessment at a disaster site includes: geographic extent of the damage, the at-risk population, on-going hazards, approximate numbers of injuries and deaths, shelter and water availability, communications needs, and perhaps other population information for later humanitarian needs.[217] Linking this information with background information obtained during pre-disaster planning, can provide a list of factors that can be helpful in predicting the potential for injury from the disaster. These variables have been classified into community resources, medical resources, the presence of a community/organization disaster plan, the amount of advance warning, the population at risk, the time of day and weather conditions, and the geographic location.[218]

Overall, planning for disaster assessment needs to assume the stature of disaster response. As discussed in the ARB, an assessment tool, used by experienced persons, must deploy with the FEST. Alternative assessment tools on the site can be developed and used prior to arrival of the FEST, and should employ modern methods including the use of telemedicine, linking photos or media reports to pre-evaluated disaster models, etc. Additionally, the flow of assessment information needs to be centralized

and collated with the individuals or organizations allocating or requesting response resources, for example at the DOS EOC or a CINC EOC if the Unified Commander is leading the effort. Inaccurate assessment information will yield the same poor response effort that mismanaged assessment information does.

MOBILIZATION

MODULAR RESPONSE FOCUSED ON CUSTOMER, NOT PLAYERS

Management of the medical response during mobilization and deployment eventually becomes an exercise in information management. Timely ongoing information formulates an accurate response in order to save lives. First, the focus should be on the survivor's needs, not the extent of death or destruction. Secondly, plans for sustainment needs and support must be evaluated. Rather than looking only at the most urgent needs, which tend to be short-lived, future long-term operations must be considered early. Finally, the resources deployed overseas must meet reasonable medical needs which are not necessarily those that would occur in a US city.[219]

SECURITY

Units that deploy to a terrorist bombing usually must assume that they will deploy into a dangerous environment until security has been assured. Medical personnel, although thought to be protected from danger under the auspices of the Geneva Convention have not recently been afforded such a luxury. During the recent events in Kosovo, Albanian refugees claimed that Serbian Security Forces were deliberately targeting Albanian physicians and their facilities in an attempt to leave the population without medical care. For example, on the day following the initiation of NATO bombing, the major medical facility in Pristina was bombed, looted, and booby-trapped. Additionally, more than ninety community-based health care clinics supported by the Mother Teresa Society were attacked and destroyed following the NATO bombing.[220] Similarly in Chechnya, Russian Commanders in January 2000 reported that Chechen saboteurs set fire to one of Russia's four military field hospitals, destroying three tents that housed surgery, anesthesiology, and intensive care wards. [221] This factor must be considered by operations personnel who man the various EOCs and formulate the resources that will respond. A potentially threatening environment will most likely mandate that the DOD provide the medical and transportation assets.

"MEDICAL ICS" AS FORMAT

Just as ICS can serve as a model of an operations' command and control organization, a "medical ICS" should be formulated early in a response. Such an organization should take place at both the

strategic or operational level as well as at the tactical level of medical support. Using the Embassy bombing as an example, medical leaders from DOS, DOD (likely J4-MRD), and others as needed (e.g. DHHS' OEP) should coordinate their efforts in the DOS EOC; this must be linked to the responsible CINC Surgeon office. Their efforts will then coordinate the response and should outline the tactical medical ICS on scene, thereby ensuring a smooth flow of information, unbiased by agency-specific issues.

DEPLOYMENT

The Commander in Chief (CINC), US Transportation Command (USTRANSCOM), is the single manager for all defense transportation in times of war and peace. USTRANSCOM, serving as a supporting Unified Command, moves personnel and material based upon validated requirements from the supported Unified Command. Air Mobility Command under USTRANSCOM oversees all air movement and is the worldwide aerial port manager; it also administers and executes the Civil Reserve Air Fleet (CRAF). CRAF policies designate civilian aircraft as international, aeromedical, or national carriers. It can be activated incrementally by USCINCTRANS with the approval of the Secretary of Defense. The first window of availability, Stage I, is for the carrier to be at the mission location within twenty-four hours following their activation assignment is made.[222]

Although clearly more detailed than outlined here, specific policies and procedures exist to support movement of personnel and patients in times of emergency. DOS or DHHS assets desiring to move on DOD aircraft need to not only be familiar with the procedures, but also complete as much pre-emergency planning as possible. Defined Intergovernmental Support Agreements codify the arrangements and permit smoother access to DOD aircraft in times of emergencies. The USTRANSCOM Surgeon General has the authority within his area of expertise to sign such agreements with respective counterparts in the Executive Branch.[223]

MEDICAL SUPPORT OPERATIONS

COMMUNICATIONS

Ground communications were a major problem in Nairobi, and remain critical to orchestrating the response effort. Even in the United States, in approximately 67% of disasters, no communications exist between the site and the receiving hospitals. Response efforts will only be exacerbated in a communications-poor setting.[224] Prior to deployment overseas, VATF1, the Virginia-based Search and Rescue Team that can respond to overseas disasters obtains cell phones from a contractor in the Washington, DC area that operate in a host country. Such communications plans should be developed for each Embassy's EAP and for contingencies in countries within a Unified Command.

Responding to requests for information from the CINC Headquarters and the DOS EOC in Washington should similarly be planned. Communications plans typically do not include contingencies for specific medical needs, though they should be considered. Ideally the systems should be light, transportable, mobile, and reliable under a variety of conditions. The major challenge is matching the communications needs to the disaster. For example, telemedicine capability may be ideal, but it must meet the needs of the highly variable disaster environment where first responders primarily need a reliable phone link. [225]

INTERACTIONS WITH HOST NATION SUPPORT

Units "on call" for deployment should, as part of their basic training requirements (analogous to operations security briefings, preventive medicine lectures, etc.) receive a generic briefing from DOS on some of the basic cultural sensitivities in their area of operations. These briefs could then be tailored to the specific country prior to movement. "Understanding and appreciation of the host country's resources and culture must shape other agenc[y's] responses, even in the medical arena."[226] When the units finally arrive, the focus should be on what local officials (host nation or operational commanders) want completed, rather than what the team believes needs to be completed. Lastly, common use of the English language in Nairobi significantly aided the response effort, a luxury that can not always be assured. Where English is not a common language, translator support will also need to be planned into response efforts.

MEDICAL TREATMENT

The assets that respond to an overseas disaster such as a terrorist bombing are normally units heavily configured to conduct trauma, resuscitative surgery. Additionally, given the normal tents and life-sustaining gear that accompany them, most units strive to set-up near the disaster site if feasible. However, placing physicians at disaster scenes, unless they are specifically trained, create unnecessary confusion on the rescue personnel. As a rule, physicians and other hospital personnel function best in a clinical environment (which can be austere), whereas pre-hospital medical personnel work best at the disaster site. Specific guidelines for role assignments should be implemented by the leaders on scene. This designation by "familiarity with function" will improve the performance effectiveness of the responders.

Some of the principles for assigning people are:

1. Medics perform the initial assessment, triage, and stabilization at the scene prior to transporting the patients to the triage/treatment areas where the physicians are located.
2. Only those physicians and nurses with specific pre-hospital training should be at the scene, or even deploy to a field site.

3. Medics work best in the pre-hospital environment and are usually poorly prepared to replace nurses.
4. Physicians and nurses, rather than medics, should manage the public-health needs of disaster victims.[227]

The bottom line is, "people do best what they do most."[228]

Movement on medical evacuation aircraft requires specific patient preparation. Although this requirement at times appears to delay movement to those on the ground, and is inherently conservative, for resuscitation of a deteriorating patient in the air is extremely difficult. In addition to having experienced personnel on site to assist in preparation, units who deploy require extensive training in aeromedical evacuation systems and preparations.

GROUND TRANSPORTATION

As discussed in the Nairobi event, ground movement was problematic. The Embassy staff had a difficult time moving to each of the local healthcare facilities to assess the patients, as did the CCATT when they arrived. Additionally, the patients had to be moved to the airfield at night when traffic was at a minimum, often in vehicles of convenience. Planning for such ground movement must be considered in any overseas medical disaster. Additionally, in many locations the victims at the treatment facilities may have received minimal care. Moving patients to the location of any US medical assets, or preparing them for movement on evacuation aircraft, will require some form of ground transportation, again pointing to the urgent need for this to be a part of the response effort.

AEROMEDICAL EVACUATION

Extra crews need to deploy with medical evacuation missions in order to obviate the delays imposed by crew rest. This requires DOS to revamp and improve its procedures for requesting DOD assistance in MCIs. Alternatively, DOS should explore other transportation assets, including commercial air, to move medical supplies and patients.[229]

MENTAL HEALTH SUPPORT

This event highlighted the stresses placed upon not only the victims of a bombing, but also those involved in a rescue effort, and corroborates the psychological stresses found in published studies. Mental health support operations, using DOS-trained persons, DOD assets, and perhaps others need to be included early in the response force package in order to treat acute mental illness and prevent long-term sequela.

MISCELLANEOUS

Other common factors unit leaders need to monitor are the general health of the unit, miscellaneous non-medical requirements, family issues, safety measures, medical records, medical reports to higher command authorities and the media, the ongoing logistical support needs, and anticipating requirements rather than reacting to shortages.[230] Finally, mortuary affairs support must be similarly planned. As occurred in Nairobi, identifying and managing the human remains of colleagues placed undue burden on an already overtaxed embassy staff. DOD, or perhaps DHHS/OEP DMORT teams must be similarly trained and prepared for overseas movement to such a disaster.

REDEPLOYMENT

FORCE PROTECTION

Exposure to a disaster, particularly in an overseas environment, places exceptional burdens on response personnel. Long-term consequences of the deployment can perpetually affect the physical, emotional, and spiritual health of those who deployed; upon their return, these lasting effects can also affect their co-workers, friends, and family members. For example, ongoing mental health support to DOS and rescue personnel was clearly evident at least three months following the event and manifests the needs for tracking, monitoring, and treating the mental health needs of those victims of the event.

Planned re-deployment tracking of deploying personnel must be integrated into any organization contemplating the support of such missions. DOD, for example, has learned the hard consequences of long-term illnesses and identifying those at risk following Operation Desert Storm in 1991. In order to prevent the repetition of such lingering questions, personnel who deployed to Bosnia-Herzegovina under Operations Joint Endeavor and Guard were required, upon re-deployment, to undergo extensive medical and mental health evaluations at an Intermediate Staging Base in Taszar, Hungary. Other governmental agencies, and particularly those managing civilian volunteers, owe their response personnel similar vigilance.

AFTER ACTION REPORTS

AAR's remain an invaluable means of ensuring each disaster response improves upon the last and minimizes error duplication. This process is commonplace in DOD. For example in ninety-seven DOD-led exercises from June 1995 to June 1998, 81% had a completed AAR; this compares with only 53% in seventy-two other exercises where DOD played a role but did not have the lead.[231] Preparation of AAR's are second nature to military professionals and should be extended to other governmental agencies as well. In operations where the Army has a major role, AARs follow specified formats and remain in the Center for Army Lessons Learned where they become available to all. In fact, the AAR process in

Operations Joint Endeavor and Guard involved dedicated, tasked individuals who, with command support, ensured such information was collected.

This process is not unique, though, to the military. In the American Red Cross, follow-up evaluations of disasters entails a formal process conducted by national headquarters. Importantly, the review includes those persons who served as leaders in the disaster-relief operation, as well as those in the organization who can implement recommended changes. [232]

Unfortunately, AAR's today tend to be compartmentalized within organizations, often further buried and made inaccessible because of classification. A formal, multi-agency review process must be implemented to ensure process improvement. Such a review will require senior leadership involvement. The Medical Interagency Working Group, although tasked to look at the medical support to the Kenya Embassy Bombing, has not published a formal review of the ARB's findings, nor looked at the institutional processes involved. Failure to systematically review the medical support to disaster responses in a thorough and timely fashion, to make recommended systematic changes, to implement them, and finally to exercise them dooms subsequent responses to the same limitations.

CONCLUSIONS

The Kenya Embassy Bombing killed Americans, local national employees, and local citizens. The efforts of the medical personnel from several Federal Agencies and the quality care the local hospitals provided saved countless lives and treated many wounded. The care and interagency cooperation at the scene was chaotic, but excellent. The overall response effort, though large and thorough, was not timely and was fraught with many problems. Many of the challenges which occurred in the bombing of the Marines' Barracks in Beirut, Lebanon in 1983 unfortunately persist.

Sudden-impact disasters, such as those caused by a terrorist bombing, often occur without warning. Although their effects are horrific and spark a large emotional outcry for assistance, they posses certain characteristics that cause predictable damage and injuries; these predictions can be made based upon historical data or disaster modeling. Given these recurring issues, planners can not only better prepare organizations to avoid or minimize the effects of such a disaster, but also plan for appropriate response efforts.

Since the Kenya bombing, many improvements have been made. For example, USEUCOM assets have further refined their deployment capabilities to become more responsive to a sudden event. DOS has added medical personnel to its FEST[233], which also will get more reliable transportation, and has begun to standardize medical intelligence information and personnel training for its people. Additionally, other response assets have been developed to aid in the response effort, including DHHS/OEP's IMSUrT. Finally, most importantly, the responsive agencies have begun to review and discuss response efforts, thereby improving upon much-needed interagency communications.

However, many problems persist. These issues will cost lives, particularly in a more devastating event that may include nuclear, chemical, or biological weapons, or in a more austere environment than Nairobi, Kenya. Overseas disaster responses today involve many Federal Agencies, yet oversight in all functional areas appears happenstance. FEMA ensures all aspects of the FRP are addressed and within ESF VIII, DHHS/OEP seeks to cover all important health-related efforts. However, overseas the coordination of these efforts, particularly in the medical response, remains disjointed.

Preparation for disasters helps minimize their effects. Unfortunately, the more removed the Nairobi bombing becomes, the less emphasis such planning takes. Responsive agencies must keep this effort on the "front burner" and avoid planning apathy and delays, such as the many-month pause in the meeting of the Medical IWG from 1999 to 2000. The planning process needs more substance than informal agreements. Thorough, systematic review of the issues, by phase of a disaster response, with involvement of all responsive players, will improve communication, develop a response guideline, and lead to important training exercises. In this process, streamlining of medical decision making, from accurate assessment to deployment of assets to meet the predictable requirements must also occur, particularly when response efforts cross agency and service boundaries. A DOD or Federal repository of epidemiologic study of disasters and the response effort, particularly in an overseas event, must develop and be accessible to ensure lessons learned are not repeated.

Finally, the planning and training process itself must continue in order to break the interagency culture suspicions that persist. Misunderstanding of missions, capabilities, and goals of each agency will impede the necessary development of coordination and trust that must occur. The Kenya Embassy bombing should enlighten the agencies that will respond to the next bombing event to the need for a coordinated effort of planning, assessing, responding, and evaluation in disasters overseas. Focusing on agency-specific issues and tactical level responses are helpful, but will not change the processes needed to save American lives.

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